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Knowledge for the People;

OR, THE PLAIN

WHY AND BECAUSE.

FAMILIARIZING SUBJECTS OF USEFUL CURIOSITY AND
AMUSING RESEARCH.

BY JOHN TIMBS,

Editor of 'Laconics:' 'Arcana of Science and

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Author

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"Its beginning is pleasure, its progress knowledge, and its objects truth and utility."—*Sir Humphry Davy.*

Zoological Series.

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KNOWLEDGE FOR THE PEOPLE:

OR THE

PLAIN WHY AND BECAUSE.

PART II.—ZOOLOGY.—QUADRUPEDS.

ZOOLOGY.

QUADRUPEDS.

THE GENERAL SUBJECT.

Why are certain animals called Mammalia or Mammifera?

Because they have breasts (*mammæ*) with which the females suckle their young.

Why is the class of mammifera placed at the head of the animal kingdom?

Because, not only that we ourselves belong to it, but it is that class which possesses the most numerous faculties, the most delicate sensations, and the greatest variety of action; and in which the assemblage of all these qualities appears so combined, as to produce an intelligence more perfect, more fertile in resources, less the slave of instinct, and more capable of progressive perfection, than what is found in any of the other classes.

Why are mammalia and birds called warm-blooded?

Because their blood is of heat about 100°, more or less.

Why are other animals called viviparous?

Because they produce their young alive and perfect, (from *vivus* and *pario)* as man, quadrupeds, &c.

Why are certain animals called vertebrated?

Because they have a cranium, or bony cavity, containing the brain, and a succession of bones called the spine, and the divisions of it *vertebræ*, proceeding from the cranium, and containing a prolongation of the brain, denominated the spinal marrow.

Why are other animals called invertebrated?

Because they have no vertebræ.

Why does the faculty of instinct differ from intelligence?

Because instinct makes animals perform certain actions, necessary to the preservation of the species, but often altogether foreign to the apparent wants of the individual; and often, also, extremely complicated. We cannot attribute these actions to intelligence, without supposing a degree of foresight and understanding infinitely superior to what we can admit in the species that perform them. The actions performed by instinct are not the effects of imitation, for the individuals that execute them, have often never seen them done by others; they bear no proportion to the common intelligence of the species, but become more singular, more skilful, more disinterested, in proportion as the animals belong to the less elevated classes, and are, in other respects, most stupid. They are so much the property of the species, that all the individuals perform them in the same manner, without any improvement.

The working bees have, since the beginning of the world, constructed the most ingenious edifices, agreeable to principles of the highest geometry, and destined to lodge and nourish a posterity which is not even their own. Solitary bees and wasps form also very complicated nests for their eggs. From the egg there springs out a worm, which has never seen its mother, which does not know the structure of the prison in which it is enclosed; but, when once it is changed into a wasp or bee, it constructs a similar nest, equally perfect, for its own egg.

BONES.

Why is fossil osteology, or the knowledge of bones dug out of the earth, an important branch of anatomy?

Because it not only brings to our knowledge races of animals, very different from those with which we are acquainted, but supplies many intermediate links, in the gradation of structure, which are wanting in the present creation; and, therefore, makes it probable that, when the two are sufficiently investigated, one regular, connected chain will be formed, each class of animals imperceptibly running into that which is next to it. — *Sir E. Home.*

Why are bones excellent manure?

Because of the large proportion of lime which they contain.

Why are teeth important in identifying different animals?

Because, by the largeness of the tooth, the naturalist can judge of the relative size of the animal which bore it; and by the form of the tooth he can tell whether it was fitted to grind grass, or to tear flesh; and therefore, whether it belonged to an herbivorous or a carnivorous species. Pursuing his enquiries from this point, he could decide in a great degree, as to the structure of the stomach and viscera; the extremities, whether armed with claws or protected with hoofs; and, farther, he can judge of the vivacity of the senses which belonged to the animal, and of the habits which it derived from its peculiar conformation:—knowing, beyond all doubt, that there was an intimate agreement in all the properties of its existence, and that every thing in its organization was regulated by an undeviating harmony. — *Lib. Ent. Knowledge.*

Why are the lives of wild animals shortened by the loss of teeth?

Because, as old age increases, the teeth fall out, and the means of obtaining food thus failing, the body sinks to rest. Man is the only animal that can counteract the fatal consequences of the loss of teeth.

Why are the incisor or front teeth of gnawing animals always sharp?

Because, as the teeth are covered by enamel only on their anterior or convex surface, and the bone wears down much faster than this harder covering, the end of the tooth is a sharp cutting edge. No animal exhibits their structure better than the rat.

Why do carnivorous animals masticate their food very imperfectly?

Because their lower jaw can only move upwards and downwards, and is incapable of that horizontal motion which constitutes genuine mastication.

Why do other animals which live on vegetables, masticate their food thoroughly?

Because they can move the lower jaw backwards and forwards, and to either side, so as to produce a grinding effect, necessary to bruise grass and to pulverize grain. The teeth may be compared, in the carnivorous animals, to scissors: in the other animals, to the stones of a mill.—*Blumenbach.*

Why do carnivorous animals prey on those which derive their food from the vegetable kingdom?

Because the food of all animals either mediately or directly, is derived from vegetables.

Why are the teeth of some animals, as the cow and sheep, darker in the centre than elsewhere?

Because the cement which should fill up the teeth, is sometimes not completely deposited before the tooth cuts the gum: hence, cavities are left in the centre of the tooth, which become filled with a dark substance, composed of the animal's food, &c.—*Blumenbach.*

Why are bullets sometimes found imbedded and concealed in ivory tusks?

Because they have been lodged there by the muskets of hunters; and, as the tusks are continually growing during the animal's life, the bullet becomes surrounded by new layers of ivory, while no opening exists between it and the surface, to account for its entrance. — *Philos. Trans.*

Why does the dog, while changing his teeth, appear to have the canine teeth doubled?

Because the permanent ones cut the gum before the old ones have fallen out.

THE STOMACH.

Why are certain animals called ruminating?

Because they first imperfectly chew and swallow their food, and subsequently return it through the œsophagus or gullet, in small quantities at a time, to the mouth, there to be thoroughly masticated, and then swallowed a second time.

Why do certain animals ruminate?

Because, it is supposed, of a voluntary power in the œsophagus; and, indeed, the influence of will throughout the whole process, is incontestible. It is not confined to any particular time, since the animal can delay it, when the paunch is quite full. Blumenbach knew four men who ruminated their vegetable food, and assured him they really enjoyed the process; and two of them had the power of doing, or abstaining from it at pleasure. The final purpose of rumination, is, however, unexplained. — *Blumenbach.*

Why do some animals, as the dog, vomit very easily, while others, as the horse, scarcely can vomit?

Because of a peculiarity in the opening of the œsophagus or gullet, into the stomach, both in size and mode of termination. — *Blumenbach.*

Why are hair balls found in the stomachs of some animals?

Because the animal has licked off its own hair, which thus gradually accumulated in the stomach.

Why is this hair found in balls?

Because the motion of the paunch in which it is found is rotatory.

CLOTHING.

Why does the fur, wool, or feathers, of quadrupeds and birds, vary in quantity and quality, in different regions?

Because, generally, of the temperature of the region which the animal inhabits. Thus, the dogs of Guinea, the Indian sheep, and the African ostrich, are so thinly clothed, that they may be considered almost naked. The temperature of their bodies is thus necessarily diminished in proportion to the heat of the climate in which they live. The Iceland sheep and the Esquimaux dog, on the contrary, are covered with a warm coat both of hair and wool, which enables them to bear the most intense cold, without much inconvenience.

Why are the skins of hairs and rabbits seldom ripe in the fur till frosty weather has set in?

Because the growth of the hair is dependent upon the temperature of the atmosphere: previous to winter, the hair of all animals is increased in quantity and length, and the more they are exposed, the greater is the increase.

SECRETIONS.

Why have certain animals glands and bags secreting offensive substances?

Because they may pour out the fetid matter when pursued; and thereby effectually defend themselves, as neither man nor animal can then approach them. This explains the smell of the polecat, the skunk, &c.

Why is the gall-bladder thought to belong particularly to carnivorous animals?

Because it is connected with their habit of long fasting, and serves as a reservoir for the bile. — *Cuvier.*

RESPIRATION.

Why do animals respire?

Because their blood, white or red, hot or cold, must, in a state of health, be constantly supplied, either from the atmospheric air, or from water, with successive quantities of a substance necessary for the continuance of life (oxygen); giving off, in return, equal quantities of another, (carbon.) This remarkable process is principally effected by respiration, which red-blooded animals perform either by lungs, or, like fishes, by means of gills; and white-blooded, by analogous organs.

Why is respiration the principal cause of animal heat?

Because the air in breathing loses its oxygen, and is replaced by an equal quantity of carbonic acid gas, which is ejected from the lungs at a temperature of about 90°.

Why does the respiration of animals vary?

Because of the relative proportion of blood presented to the respiratory organs in a given time, and of the relative proportion of oxygen which enters into the composition of the fluid in which the animal lives, whether air or water.

In mammiferous quadrupeds the quantity of respiration is less than that of birds; but it is greater than that of reptiles, on account of the structure of the respiratory organs; and exceeds that of fishes, on account of the different elements in which they live. Hence result the four kinds of movements, which the four classes of vertebrated animals are particularly destined to exert. — Mammiferous animals, in which the quantity of respiration is moderate, are generally formed to develope their strength in walking or running. Birds, which have a larger quantity of respiration, have the activity and strength of muscles necessary for flying. Reptiles, in which respiration is more feeble, are condemned to crawl; and many of them pass a part of their lives in a kind of torpor. Fishes require to be supported in an element nearly as heavy as themselves, in order to exert their proper motions in swimming.

Why are digestion, circulation, and respiration called organs of involuntary motion?

Because they go on continually, without intermission from exhaustion, like the voluntary, which require repose and sleep to recruit themselves.

Why do otters remain under water for some time?

Because of certain vessels which serve to receive part of the returning blood, and to retain it until respiration can be again performed, and the lesser circulation be thereby again put in motion.—*Blumenbach.*

FEELING.

Why is the feeling the most general of the external senses?

Because it resides in the membrane that covers the whole body, called the skin.

THE EYE.

Why do certain animals see in the dark?

Because their eyes are usually of a large size, to admit a greater number of rays, and that part which is called the *choroides*, reflects, instead of absorbs, the light.

Why is a certain variety of the rat and the mole blind?

Because in both these animals, a hairy curtain, in which there is no fissure, is continued over the shrivelled eyes.

Why may the blind rat be said to have eyes, although it does not see?

Because nature has bestowed on this and similar animals, a kind of rudiment of eyes, which have not the power of perceiving light; as if in compliance with some general model for the bodily structure of such animals. —*Blumenbach.*

Why have Albinoes, white hair, or feathers, and peculiar eyes.*

Because of a defect in the colouring matter of the coverings of the skin, which is always connected with a defect in sight, arising from the deficiency in the eye of what is called the mucous pigment. Blumenbach thinks that this deficiency is hereditary in some of the mammalia, so as to form a constant breed of white animals, as in the rabbit, mouse, and horse; and that, in the same way, the ferret, whose white skin and red glassy eyes are well known, is descended from the polecat.

Why have spotted dogs, rabbits, &c, a mixture of colours in the iris of the eye?

Because the variations of the iris are connected with the colour of the hair.

Why is the muscle of the eye-ball in certain carnivorous and cetaceous animals called the retractor of the eye?

Because it enables the animals which possess it to draw the globe back into the orbit.

THE MUSCLES.

Why is the heel of the badger covered with long hair?

Because the heel itself cannot rest on the ground; although the structure both of the bones and muscles of the lower extremity of this animal approaches considerably to that of man. —*Notes to Blumenbach.*

Why do the squirrel, opossum, &c, grasp objects by their two fore-paws?

---

* Among Albinoes are not only quadrupeds and birds, but the human race.

Because they want a separate thumb to act in opposition to their fingers, which are sufficiently long and moveable.

Why are carnivorous animals unable to grasp any object?

Because that toe which is in the situation of a thumb is parallel with the other toes.

Why is Five said to be the most favourite number of Nature?

Because at least the half of all known plants have the parts of fructification in *fives*, or in a number which is the product of *five*. The radiated divisions of animals are likewise in *fives* — as the sea-stars, medusæ, madrepores, &c. Throughout Cuvier's whole vertebral division, *five* is the leading number. For example, we have *five* fingers to the hand, and *five* toes to the foot, in common with most of the mammalia. We have *five* principles, constituting the higher order of vertebral animals, Man — viz, I, inert matter; II, the attractive principle; III, the living principle; IV, the sentient principle; V, the intellectual principle. — Our *five* senses — seeing, hearing, smelling, tasting, feeling, need not be added, for no one has overlooked this fact. — *Professor Silliman.*

Why do animals and plants return to their native earth?

Because, after death, their bodies are gradually destroyed by fermentation, putrefaction, and the chemical affinities of their elements, and thus internal organization is destroyed.

Why are apes called four-handed animals?

Because, instead of having a great toe parallel with the others, they are furnished with a real thumb, that is, a part capable of being opposed to the other toes.

Why do apes live in trees?

Because their four hands enable them to climb with the greatest facility.

Why are the hands of apes much less useful than the human hand?

Because the thumb is small, short, and weak, and the other fingers long and slender; and the great superiority of the human hand arises from the size and strength of the thumb.

Why does the ourang-outang walk but imperfectly in an erect position?

Because parts of his toes are remarkably curved in their shape; whence he holds the branches of trees more firmly.

Why have many species of the ape-tribe cheek-pouches?

Because they may place small reserves of food in them, while living in trees.

THE BAT.

Why are bats supposed to perceive external objects, without coming actually in contact with them?

Because in their rapid and irregular flight amidst various surrounding bodies, they never fly against them; yet it does not seem that the senses of hearing, seeing, or smelling, serve them on these occasions, for they avoid any obstacles with equal certainty when the eye, ear, and nose are closed: hence naturalists ascribe a *sixth sense* to these animals. It is probably analogous to that of touch. The nerves of the wing are large and numerous, and distributed in a minute plexus (network) between the integuments. The impulse of the air against this part, may possibly be so modified by the objects near which the animal passes, as to indicate their situation and nature.—*Notes to Blumenbach.*

Why does the bat tribe fly?

Because the fingers of the fore-feet, the thumb excepted, are in these animals longer than the whole body, and between them is stretched a thin membrane or web, for flying. Hence they are as little capable of walking on the ground as apes with their hands, or sloths with their hooked claws, which are calculated for climbing.

Why is a certain species of bat called a Vampyre?

Because it sucks the blood of larger mammifera than itself, as well as of men when asleep, in whom it commonly attacks the toes. — *Blumenbach.*

SQUIRRELS.

Why is a certain species of squirrel said to fly?

Because it has a loose membrane extended laterally between the fore and hind feet, which serves the purpose of a parachute, and enables the animal to spring from great heights. — *Blumenbach.*

Why do the flight-like leaps of some squirrels differ from flying?

Because the provisions for the purposes of wings rather support the animal in its long and desperate leaps, than raise it in the air, and direct it towards any given object. The want of proper muscles, also, in a great measure incapacitates them from performing such offices as are dependent on volition, or will.

Why does this species of squirrel always fly from the upper parts of trees?

Because it cannot rise in its flight, so that, in proportion to the distance the tree it designs to fly to is from them, so much the higher they mount the tree they fly from, that they may reach some part of the tree, even the lowest, rather than fall to the ground.

THE DORMOUSE.

Why does the fat dormouse remain in a torpid state throughout the winter?

Because this creature possesses so little heat, that it scarcely exceeds the ordinary temperature of the air: its torpor ceases with the cold; a few degrees of heat, about 10 or 11, will reanimate it, and if kept during winter in a warm room, it continues action, like other animals,the whole season. When the cold approaches, it rolls itself into a ball, and in this state may be found in winter in hollow trees, clefts of rocks, or in holes in walls exposed to the south; it may be taken and rolled about without being roused—nothing, indeed, seems to awaken it from its lethargy but gradual heat. If exposed suddenly before a fire, it dies; resuscitation can only be effected by degrees. In this state, however, although deprived of the capability of movement, with the eye closed, and in an apparent state of death-like indifference, it possesses a feeling of pain, when sharply inflicted; a wound or a burn causes it to contract, and to make a slight sort of convulsive leap, which it will repeat several times.

THE MARMOT.

Why have marmots been called 'haymakers?'

Because they bite off grass, turn it, and dry it in the sun. It is said they use an old female marmot as a cart: she lies on her back, the hay is heaped on her belly, and two others drag her home.—*Med. Gazette.*

THE LEMMING.

Why were lemmings formerly said to fall from the heavens?

Because whole legions sometimes emigrate from one place to another, and their unexpected and unnoticed arrival, together with the accidental fall of those which might have escaped from the claws of birds, by which they had been taken up into the air—probably gave rise to this superstition.

Lemmings emigrate in such numbers, that the country is literally covered with them; marching always in a straight direction, and never suffering any obstacle to impede them. On reaching a river, the foremost advance, and swimming across, form a kind of floating bridge, the head of each supported by the hinder part of that before it. The remainder of the lemmings then pass rapidly over the backs of the supporters, and thus gain the opposite shore.—*De Capell Brooke.*

PORCUPINES.

Why does the porcupine rattle its prickles?

Because it is enraged: it has not, however, the power of shooting them at its pursuers.—*Blumenbach.*

Why are porcupines erroneously supposed to dart their quills to a distance?

Because it is probable, that being loosely attached to the animal, they are occasionally broken off, and remain fixed in substances into which they have been thrust.

Why are the spines or quills of the Canada porcupine fatal to its assailants?

Because the quills are rough with minute teeth, directed backwards, that render this seemingly weak and flexible weapon a very dangerous one. Their points, which are pretty sharp, have no sooner insinuated themselves into the skin of an assailant, than they gradually bury themselves, and travel onwards until they cause death, by wounding some vital organ

THE HEDGEHOG.

Why does the hedgehog stick its prickles into fruits?

Because it may bring them to its holes, a fact which has been asserted by the ancients, and denied by the moderns; but of which, observes Blumenbach, 'I have been assured by three credible witnesses.'

THE WATER-SHREW.

Why has the water-shrew small stiff hairs on the toes?

Because they render the foot excellently adapted for rowing, and serve instead of a swimming membrane. The minute shrew is the smallest mammiferous animal yet known: it weighs but half a drachm.—*Blumenbach.*

THE OPOSSUM.

Why does the female opossum carry her young in a pouch on the belly?

Because the teats are placed at the bottom of this pouch. The young ones are born small beyond all proportion, like imperfect abortions. Being carried in this pouch, and nourished by the mother's milk, until mature, and more perfectly formed, they are, as it were, born for the second time. — *Blumenbach.*

THE SKUNK.

Why is the skunk so called?

Because of the insupportable stink, which it, like several other species of this genus, emits when enraged. — *Blumenbach.*

THE ICHNEUMON.

Why is the ichneumon so serviceable in Egypt?

Because it destroys the eggs of the crocodile, and also serpents.

THE WEASEL.

Why was it said that the weasel produced her young in the mouth?

Because the mother often carries the young ones in her mouth. — *Blumenbach.*

THE PINE-MARTEN.

Why is the pine-marten valued for its skin?

Because its beautiful fur comes nearest to that of the sable.

BEARS.

Why has the polar bear a firm footing on the ice?

Because the soles of his feet are almost entirely clothed with long hair.

Why are polar bears sometimes met with in the winter months?

Because, not having accumulated sufficient fat for their winter sustenance, they are compelled to shift for themselves during the usual period of torpor.

Why does the male polar bear retire to his winter-quarters with less regularity than the female?

Because in the females this retreat is essential to the preservation and security of their offspring.

Why are the female bears more ferocious on emerging from their winter-quarters than at any other season?

Because of their extreme leanness, and the cravings of their own appetites, combined with the necessity of providing for their young.

Why is it said that no man, either Christian or Indian, ever killed an American she-bear with young?

Because the pregnant females always conceal themselves.—'After numerous enquiries among the Indians of Hudson's Bay,' says Dr Richardson, 'only one was found who had killed a pregnant bear.'

Why is the flesh of some bears tainted and unfit for use?

Because they have fed much upon fish; otherwise they are reckoned very good eating. Their tongues and paws are considered the most delicate parts, and the hams made from them are said to be not inferior to those of Westphalia.

Why do bears live through the winter without food?

Because they absorb the fat accumulated in the course of the summer, from the setting in of the cold season until the return of spring.

Why does the honey bear attack bees with impunity?

Because it has a shaggy fur, with an uncommonly thick and lax skin, by which it is defended alike from the stings of bees and the teeth of dogs.

Why are bears said to hug their enemies?

Because, when irritated, they usually raise themselves upon their hind feet, and endeavour to engage

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and squeeze their opponent between their fore-legs, which are excessively powerful.

DOGS.

Why is the dog less carnivorous than the cat-tribe?

Because the cheek teeth are less adapted for tearing flesh, and the tongue is smooth.

Why do the dog and the elephant approach nearer than any other quadrupeds to the perfection of man?

Because of the following peculiarities: the dog is the only animal that dreams; and he and the elephant the only animals that understand looks; the elephant is the only animal that, besides man, feels *ennui;* the dog, the only quadruped that has been brought to speak. Leibnitz bears witness to a hound, in Saxony, that could speak distinctly thirty words.

Why does the domestic dog differ from other varieties?

Because it has the tail curved upwards. Whenever there is white on any part of its tail, the *tip* is invariably white.

Why is the dog so attached to man, while almost every other quadruped fears man as its most formidable enemy?

Because this particular species of animal feels a natural desire to be useful to man, and, from spontaneous impulse, attaches itself to him. Were it because we train the dog to our use, and have made choice of him in preference to other animals, we should see, in various countries, an equal familiarity with various other quadrupeds; but everywhere the dog only takes delight in associating with us, and is even jealous that our attention should be bestowed on him alone; it is he who knows us personally, watches for us, and warns us of danger. — *Cuvier.*

Why is the dog the most complete, the most remarkable, and the most useful conquest ever made by man

Because every species has become our property each individual is altogether devoted to his master, assumes his manners, knows and defends his goods, and remains attached to him until death; and this proceeds neither from want nor restraint, but solely from true gratitude and real friendship. The swiftness, the strength, and the scent of the dog, have created for man a powerful ally against other animals, and were perhaps necessary to the establishment of society. He is the only animal which has followed man through every region of the earth.—*Cuvier.*

Why are dogs considered by some naturalists to be domesticated wolves?

Because the anatomy of both, for the most part, corresponds: the wolf is, however, larger and more muscular. Their period of gestation is the same, although differently stated by Goldsmith; which statement led to an inference, that the dog and the wolf were essentially a different species.

Why do dogs bark at beggars?

Because the rags and misery of the poor mendicant induce the imagination of the dog to see in him a robber of his master's house, or one who will be cruel to himself—and he expresses his own fears by a bark.

Why is a house-dog terrified at a naked man?

Because the latter is to the dog an unaccustomed sight.

Why are dogs enabled to bear hunger for a very long time without any serious injury?

Because they have a supply of some substance for the distension of their stomachs; hunger being the effect of the stomach's contraction. Dogs have been known to live for forty days without food, or substitute for food.

Why is the Mackenzie-river dog so valuable to the Indians in the chase?

Because its want of courage and strength to pull down large animals, is more than compensated by its broad foot and light make, which enable it to run over the snow without sinking, if the slightest crust is formed on it, and, thus, easily to overtake and tear the moose or rein-deer, and keep them at bay till the hunters come up. — *Dr Richardson.*

Why is the hare-Indian dog peculiar to the banks of the Mackenzie River?

Because, being only fitted for the chase, it has, since the introduction of guns, gradually given way to the mongrel race, sprung from the Esquimaux, Newfoundland, and this very breed, with occasional intermixture of European kinds. Formerly, perhaps, it was generally spread over the Northern parts of America. — *Dr Richardson.*

Why do Newfoundland dogs swim better than others?

Because they are semi-webbed between the toes; which mechanism of the foot presents an extended surface, to press away the water from behind, and then collapses, when it is drawn forward, previous to making the stroke. Sir Everard Home describes this action as rowing through the water.

Why is the 'wilde hond' of South Africa also called the 'hyæna-dog.'

Because it connects the dog and wolf tribe with that of the hyæna. In like manner the gnu forms a graceful link between the buffalo and antelope.

Why are the mastiffs of Cuba so highly prized by the natives?

Because they are eminently faithful, and as courageous as they are powerful, although by no means remarkable for their intelligence. They are chosen, in preference to all others, for house-guards and watch-dogs.

Why is the terrier so called?

Because it burrows the earth *(terra)* in pursuit of foxes. — *Caius.*

Why is the harrier so called?

Because it hunts the hare. — *Caius.*

Why was the bludhunde, or bloodhound, also called 'slothunde'?

Because *slot* means the impression left by the foot of the dog in the mire. This dog was remarkable for the acuteness of his smell, tracing any wounded game that had escaped from the hunter, and following the footsteps of the thief, let the distance of his flight be ever so great. The bloodhound was in great request on the confines of England and Scotland, when the borderers were continually preying on the herds and flocks of their neighbours, and was used also by Wallace and Bruce during the civil war. Pennant says, 'there is an order dated, so late as 1616, that no less than nine bloodhounds should be kept on the Border, upon Esk and other places mentioned.' — The hound is essentially the same as the bloodhound. The fox-hound is a smaller variety, and the harrier is still smaller. — *Cuvier.*

Why is the spaniel so called?

Because the race is derived from Spain; thence, *épagneul*, French, *spaniel*, English.

Why is the greyhound the first in rank among dogs?

Because, by the forest laws of Canute, it was enacted, 'that no one, under the degree of a gentleman, should presume to keep a greyhound;' also from an old Welsh saying, which signifies that you may know a gentleman 'by his hawke. his horse, his grehunde.' The greyhound is feelingly alive to caresses; and, when noticed, the motions of his heart are most violent and irregular. Caius, however, on the authority of Froissart, mentions the following fact, not much to the credit of the fidelity of this species: — When that unhappy prince, Richard II, was taken in Flint Castle, his favourite greyhound immediately deserted him, and fawned on his rival, Bolinbroke; as if he understood and fore-saw the misfortunes of his former master. This act of ingratitude the unfortunate monarch saw, and declared aloud to be the presage of his future death. — 'Ray, Linnæus, &c, give the name of *graius* to the greyhound, with which, however, the ancient Greeks do not appear to have been acquainted.' — *Note to Blumenbach.*

Why was the leviner, or lyemmer, so called?

Because of the lightness of the kind, (from *levis*, light) and the old word *lyemme*, a thong; this species being used to be led with a thong, and slipped at the game.

Why is the mastife or mastiff so called?

Because it is a species of great size and strength, and a very loud barker; whence *mastiff*, quasi *mase thefese*; it being supposed to frighten away robbers by its tremendous bark.

Caius says three mastiffs were a match for a bear, and four for a lion. It appears that Great Britain was so noted for its mastiffs, that the Roman emperors appointed an officer in this island, whose sole business it was to breed, and transmit from hence to the amphitheatre, such dogs as would prove equal to the combats exhibited at that place.

Why was the old English hound so well qualified for hunting?

Because his hearing was very perfect, and his sense of smell was the most exquisite that could be imagined.

Why does the scent in hunting vary on different days?

Because of the varied condition of the ground, and the temperature of the air, which should be moist without being wet. If both are in this state, the scent is said to be perfect. When the ground is hard and dry, there will scarcely be any scent, and it hardly ever lies with a north or an east wind. A southerly wind, without rain, and a westerly one that is not rough, are the best; a warm day, without sun, is a perfect one. In some fogs the scent lies high; in others not at all. — *Notes on Science.*

THE WOLF.

Why was January called by the Anglo-Saxons 'Wolf-monat'?

Because, according to Verstegan, 'people were wont always in that moneth to be more in danger to be devoured of wolves, than in any season els of the yeare; for that, through the extremity of cold and snow, those ravenous creatures could not find of other beasts sufficient to feed upon.'

Why are the wolves white in the Arctic regions?

Because, probably, of the severity of the winter season, which causes their loss of colour; though the change does not occur in all cases. — *Sabine.* Desmarest, though he admits this change, notices the white wolf as a variety belonging to the peculiar description of animals called Albinoes.

THE JACKAL.

Why is the jackal called the lion's provider?

Because, at the jackal's cry, echoed by hundreds of similar voices, through the woods and plains, the lion, whose ear is dull, rouses himself to action, to join in the pursuit of some unhappy wanderer from the herds, which has crossed the jackal's path.

Why is the jackal difficult to domesticate?

Because of the strong odour which he emits, as filthy as that of the fox; and his extreme timidity at the sight of a stranger.

Why is the jackal serviceable in hot countries?

Because, like the vulture and hyæna, he does not require living prey to feed upon; but wherever there is an animal body putrefying, his nose scents it at a great distance, and the air is soon freed from the effluvium.

THE FOX.

Why does the fox seize his prey with his teeth?

Because his claws are thick, short, blunt, and cannot be drawn in; so that he cannot use them like the cat, or secure his prey otherwise than by the teeth.

Why does the fox hide himself in burrows in the day, and prowl about in a clouded night?

Because he may avoid the full blaze of day-light, which, becoming painful to his eyes, compels him to close their pupils, so as to render their vision very imperfect. Much of the cunning suspiciousness of manner for which the fox is notorious, arises from this circumstance: his attitudes and motions partake of the uncertainty of his sight, and he appears to be most cunning when he is really most short-sighted. — *Sec. Zoolog. Soc.*

Why is the cross-fox so called?

Because he has a black cross on his shoulders: in shape he differs very little from the common fox.

Why is fox-hunting still kept up in England?

Because the breed is not extinct,—partly from the extreme prudence of the animal, and partly from its being considered unsportsmanlike to kill a fox, except in the chase.

Why is it considered that the three hundred 'foxes' to whose tails Sampson tied fire-brands, were jackals?

Because jackals assemble in large troops, so as to be taken in great numbers; whereas the fox is a solitary animal.

THE HYÆNA.

Why had the hyæna formerly the epithet of 'laughing'?

Because of a belief among the Greeks and Romans, that it imitated the human voice, and charmed shepherds, so as to rivet them to the spot upon which they were met by the quadruped, in the same way that a serpent fascinates a bird.

THE CAT TRIBE.

Why are the characteristics of feline animals so interesting to the naturalist?

Because animals of the cat kind are, in a state of nature, almost continually in action, both by night and by day. They either walk, creep, or advance rapidly by prodigious bounds; but they seldom *run*, owing, it is believed, to the extreme flexibility of their limbs and vertebral column, which cannot preserve the rigidity necessary to that species of movement. Their sense of sight, especially during twilight, is acute; their hearing, very perfect; and their perception of smell less so than the dog tribe. Their most obtuse sense is that of taste. In fact, the tongue of these animals is as much an organ of mastication as of taste; its sharp and horny points, inclined backwards, being used for tearing away the softer partso the animal substances on which they prey. The perception of touch is said to reside very delicately in the small bulbs at the base of the mustachios.—*Wilson.*

Why does all the cat tribe possess such great strength of jaw?

Because the opening of the mouth is of great extent in proportion to the size of the animals; the muscles which move the lower jaw are also of great bulk, and the point on which they immediately act, is brought so far forward, in consequence of the breadth and shortness of the muzzle, as to give them the highest degree of attainable force.

Why are the claws of the cat tribe always sharp?

Because their edge and point is preserved by the animal withdrawing them in sheaths, enclosed within folds of skin, which cover the extremities of the toes.

THE LION.

Why has the lion been styled 'king of the beasts?'

Because, in strength, he surpasses all other animals. His generosity and courage are more doubtful. Mr Burchell, the African traveller, says: 'when men first adopted the lion as an emblem of courage, it would seem that they regarded great size and strength as indicating it; but they were greatly mistaken in the character they have given to this indolent, skulking animal, and have overlooked a much better example of true courage, and of other virtues also, in the bold and faithful dog.'

Why is the lion safely attacked while sleeping?

Because of the dullness of his sense of hearing, the difficulty of awakening him, and his want of presence of mind if he be so awakened. Thus, the bushmen of Africa are enabled to keep the country tolerably clear of lions, without encountering any great danger.

Why has the lion a terrific roar?

Because of the great comparative size of his larynx, or that part of the throat which forms the upper part of the windpipe; the principal organ of voice in all animals. The absolute size of the larynx of the whale and the elephant is the largest, but relatively, the larynx of the lion has a still greater circumference.

Why is the bone of the lion's fore leg of remarkable hardness?

Because it contains a greater quantity of phosphate of lime than is found in ordinary bones; so that it may resist the powerful contraction of the muscles. The texture of this bone is so compact, that the substance will strike fire with steel.

Why does the lion draw in his claws when in quest of prey?

Because by this means, and the soft cushions of his feet, or fur upon which he treads, he is enabled to move towards his victim with greater stillness. The claws can, however, be instantly extended to seize the prey.

Why is the lion extremely strong in the fore-leg?

Because the muscles of that leg are unusually firm, as are also those of the thigh of a fighting cock. — *Home.*

Why has the lion superior firmness and pliancy of limb?

Because his joints are knit together by the remarkable strength of the muscles.

Why is the weight of the lion's body very remarkable as compared with his size?

Because of the extraordinary density of his muscles, and the compactness of his principal bones.

Why has the lion but little sense of taste?

Because his lingual, or tongue, nerve, is not larger than that of a middle-sized dog. — *Desmoulins.*

Why should we discredit stories of lions licking the hands of men without injuring them?

Because the lion's tongue has sharp and horny points, inclining backwards, so as not to be able to lick the hand without tearing away the skin.

Why does the lion, when irritated, strike his sides with his tail?

Because he may excite himself by a prickle or spur at the extremity of the tail, and concealed in the tuft of long black hairs there. This circumstance is noticed by Homer, and Blumenbach some years since verified the existence of the prickle; but the fact was unnoticed by naturalists, till last year, when it was further corroborated, on the death of two lions in the Menagerie Royal at Paris. The prickle adhering only to the skin by the circumference of its base, is very easily detached.

THE DOMESTIC CAT.

Why is it evident that cats have been domesticated from the most remote antiquity?

Because the mummies of the cat found in the sepulchres of Thebes, and the figures sculptured on monuments bearing the names of the Pharaohs, concur with the Sacred Scriptures to prove, that in the earliest ages, the cat existed in Egypt and Palestine, in the domestic state.

Why is the cat in China called 'Mao' or 'Miao'?

Because of its resemblance to its cry.

Why do cats see in the dark?

Because the external rays of light, of which there is some in most dark places, after being concentrated by those parts which are called the *cornea* and the *crystalline lens*, are reflected in a brilliant concave mirror at the bottom of the eye, called the *tapetum*.—(*Home.*) This effect may be constantly seen in the domestic cat. In the strong light of the day, the *iris* is so contracted, that a very small quantity of light is admitted to this mirror; but in the twilight the *iris* opens, and then the mirror being completely exposed, the eye glares in the manner with which we are all familiar. The construction, therefore, of the eye of the cat tribe enables them to collect in one focus whatever light may be found; — and few places are so dark but that some light may be found — as we know when we have gone into a cellar, where the darkness at first appears impenetrable, but where, even with our differently constructed organ of vision, we soon distinguish objects without difficulty. — *Lib. Ent. Knowl.*

Why does the pupil of the cat's eye serve to mark time?

Because it is like a thread at eleven at night, eleven in the morning, and five in the morning; like a jujubier nut at one in the morning, one in the afternoon, seven in the morning, and seven in the evening; and like the full moon at three in the morning, at one, nine, and eight in the evening. The tip of its nose is always cold, excepting on the day of the summer solstice, when it becomes lukewarm. —*Japanese Encyclopædia.*

Why does a cat shrink on the whiskers of her upper lip being pulled?

Because the whiskers are attached to a bed of close glands under the skin; and each of these long and stiff hairs is connected with the nerves of the lip.—*(Cuvier.)* The slightest contact of these whiskers with any surrounding object is thus felt most distinctly, although the hairs themselves are insensible.

Why does the cat lick herself?

Because the tongue is the chief instrument in cleaning herself, and is constructed somewhat like a currycomb, or rather a wool-card, being bent with numerous horny points, bent downwards and backwards, and which serve several important purposes, such as lapping milk, filing minute portions of meat from bones, and especially, keeping the fur smooth and clean; and cats are by no means sparing in their labour to effect this. The female cat is still more particular with her kittens than herself, and always employs much time in licking their fur smooth.—*Mr Rennie—in Journ. Royal Instit.*

Why does the cat destroy mice?

Because its ruling passion is for animal food, or rather the desire to destroy a living animal. Hence, also, the cat devours insects, as flies, beetles, cockroaches, &c.

Why do cats bury their excrement?

Because of an instinct of distrust resulting from their wild state, which revolts against the feeling of domestication, because the strong smell of their excrements might reveal their retreat, and the abode and asylum of their young, which are to remain concealed. Thus, it is not from cleanliness, as generally supposed.

Why is it commonly thought that cats will always fall upon their feet?

Because of the facility with which they balance themselves when springing from a height; which power of balancing is in some degree produced by the flexibility of the heel, the bones of which have no fewer than four joints.

Why do cats alight softly on their feet?

Because in the middle of the foot there is placed a large ball, or pad, in five parts, formed of an elastic substance; and at the base of each toe is a similar pad. It is impossible to imagine any mechanism more calculated to break the force of a fall.

THE SLOTH.

Why is the sloth slow in his movements, and in a state of pain, when confined in a menagerie?

Because his feet are not formed for walking on the ground; they cannot act in a perpendicular direction; and his sharp and long claws are curved. He can only move on the ground by pulling himself along by some inequalities on the surface, therefore on a smooth floor he is wretched. He is intended to pass his life constantly suspended by his four legs from under the branches of trees, thus travelling from branch to branch, and sleeping when he is satisfied.

THE CAMEL.

Why is the camel used for travelling in the deserts of hot countries?

Because its feet are formed to tread lightly upon a dry and shifting soil; its nostrils have the capacity of closing, so as to shut out the driving sand, when the whirlwind scatters it over the desert; and it is provided with a peculiar apparatus for retaining water in its stomach, so that it can march from well to well without great inconvenience, although they be several hundred miles apart.

Why do camels travel in a single file?

Because if any of the loads get out of order, they can be adjusted by leading the camel out of the line, before those behind have come up; whereas, if they marched with a wide extended front, the whole caravan must stop when any accident happens to a single camel. — *Burckhardt.*

Why do camel drivers give camels three times their usual quantity of food before proceeding over a sterile district?

Because the construction of the stomach enables the animals to ruminate upon this supply of food during a very long march. — *Burckhardt.*

Why does the camel kneel down to receive its burthen?

Because soon after a camel is born, his owner ties his feet under its belly, and having thrown a large cloth over its back, heavy stones are put at each corner of the cloth, which rests on the ground. In this manner the camel becomes accustomed to receive the heaviest loads. — *Prevost, Voyages.*

Why is the camel's tread perfectly noiseless?

Because its feet are as soft as sponge or leather, being composed of an elastic substance, and covered with hair; wherefore the large creature moves along, under a very heavy load, with no greater noise than is made by the deer bounding over the grassy turf.

Why has the camel a hump on his back?

Because the soft, fatty substance of which the hump is composed, may, when the animal is without food in the desert, become absorbed into the system, and thus afford nourishment to the animal; the hump being renewed when the camel obtains pasturage.

Why are dromedaries used for riding?

Because of their superior swiftness to the heavy

l. Thus, the camel of the caravan, or the ge camel, may be compared to the dray- ; the dromedary to the hunter, and, in some ces, to the race-horse.

THE ANTELOPE.

y are some antelopes called lyre antelopes?

ause their horns are in the shape of the lyre.

y is a certain species of antelope called the gbok?

ause it takes remarkable flying leaps, rising the back curved or elevated to the height of feet in the air, as if about to take flight.—*ell's Travels.*

y is the age of the antelope in some measure to imated by its horns?

ause the horns, which appear in the seventh h, increase rapidly in size until the third year, they have completed two spiral turns, and are ed by about twelve elevated rings. After this growth is less rapid; but at six years old the er of convolutions is increased to three, and that circular rings to twenty-seven. They are then t thirteen inches in length, nearly close at the and about a foot apart at the points. At a still advanced period they may attain sixteen, twen- even twenty-four inches in length; but the num- f complete convolutions seldom reaches four.

y are hawks flown at antelopes in hunting them?

cause the hawks keep the antelopes occupied the dogs have time to come up with them and them.

y is the term 'gazelle,' figurative of perfect y?

cause the gazelle, a species of antelope, is one e most elegant animals in nature. Its skin is ifully sleek, its body extremely graceful, its head peculiarly light, its ears highly flexible, its eyes most brilliant and glancing, and its legs as slender as a reed. The Arabian describes his mistress as 'an antelope in beauty' — 'his gazelle employs all his soul, &c' — and Byron in speaking of the dark eyes of an eastern beauty, says, 'Go look on those of the gazelle.'

THE UNICORN.

Why has the existence of the unicorn been denied?

Because it is impossible that a ruminating cleft-footed animal could have one horn, as the unicorn is represented to have: since the frontal, or forehead bone being originally divided in two, a horn could not have grown in the centre of the division. — *Camper.*

Why is the unicorn supposed to represent the horned antelope?

Because the idea of the unicorn has probably arisen from the coarse figures traced by savages on rocks: ignorant of perspective, and wishing to present in profile the horned antelope, they could only give it one horn, and thus originated the unicorn. The unicorns of the Egyptian monuments are most probably but the productions of a similarly crude style, which the religion of the country imposed on the artist. Many of the profiles of quadrupeds have only one leg before and one behind: why then should they show two horns? It is possible that individual animals might be taken in the chase, whom accident had despoiled of one horn, as it often happens to chamois and the Scythian antelope: and that would suffice to confirm the error which these pictures originally produced. It is thus, probably, that we find anew the unicorn in the mountains of Thibet. — *Cuvier.*

THE CHAMOIS.

Why does the chamois safely bound over wide chasms of rocks?

Because of his extraordinary power of balancing the body — of instantly finding the centre of gravity, — and peculiarity of all the goat tribe, to which the chamois is nearly allied. The ability of the eye to measure distances, with such undeviating exactness, is associated with this power of finding the centre of gravity. — *Lib. Ent. Knowl.*

THE OX.

Why is the hump of the zebra or Indian ox highly prized?

Because it is chiefly composed of fat, and is reckoned the most delicate part. The whole of the breeds are treated with great veneration by the Hindoos, who hold it sinful to kill them.

Why are certain cows called Alderney?

Because the breed *originally* came from Alderney, a single British island, containing only one village. It is high, rugged, and encompassed by dangerous reefs, and the islanders have very little intercourse with the rest of the world.

Why is the lower smaller than the upper jaw of a cow?

Because the cow and all other ruminating animals have their grinding teeth intersected by indented transverse furrows, and the crowns are not placed horizontally, but incline obliquely, so that in the upper jaw the outer side is highest, and in the lower, that next the tongue.

THE GIRAFFE.

Why is the giraffe also called a camelopard?

Because the Romans, who so named it, fancied it a combination of the characters of the camel and leopard: its ancient denomination was *Zurapha*, whence the name giraffe.

Why were the descriptions of the camelopard formerly received as fabulous?

Because of the absence of the animal from Europe, for three centuries and a half; whence, its extraordinary height and apparent disproportions caused it to be classed with the unicorns, sphinxes, &c, of ancient poets and naturalists.

Why were the legs of the giraffe once said to be longer before than behind?

Because of the height of the withers, which according to the animal's age, may exceed the height of the rump by sixteen or twenty inches, and which disproportion, when seen at a distance, must have lèd to the above erroneous inference. — *Le Vaillant.*

Why does the tongue of the giraffe differ from that of other animals?

Because it not only is the organ of taste, but has besides nearly all the powers of the proboscis of the elephant, although not possessed of the same strength. They differ, indeed, in one being an elongation of the organ of smell — the other of the organ of taste. — *Sir E. Home.*

Why does the giraffe move awkwardly?

Because of the disproportion of the hinder parts of its body, and the immense length of the neck, which, instead of being arched, forms an angle with the shoulders. In walking it moves the fore and hind foot of the same side together, like an ambling horse, from which circumstance it has a very remarkable motion, whence — the move of the knight at chess is derived. — *Blumenbach.*

DEER.

Why is the fur of the rein-deer used by all the tribes of the arctic circle, for winter clothing?

Because the hairs composing the coat of the deer are so thick, that it is hardly possible to discern the least portion of the naked hide; and 'a suit of clothing made of this skin is so impervious to the cold, that, with the addition of a blanket of the same material, any one so clothed may bivouack on the snow with safety, in the most intense cold of an arctic winter's night.' — *Dr Richardson.*

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the rein-deer a serviceable beast of burden ?
e of the great strength of its shoulders and ters, and the muscularity of its loins.

the Laplanders migrate with their herds of from the interior to the coast of Lapland?
e the interior, particularly its boundless so infested by stinging insects, that no n escape their incessant persecutions, but to the coast; the cool sea breezes being able to the insects. — *De Broke's Travels.*

es the rein-deer produce a crackling noise ing ?
e of the contraction of its hoofs, when the sed from the ground.

e the hoofs of the rein-deer broad and spread-

e the foot may present a large surface when deer crosses the yielding snows; and, like -shoe of the Norwegians and Canadian assist to prevent the animal sinking so it would if the hoof were small and com- that of the fallow-deer, which finds its unyielding surfaces.

FALLOW-DEER.

es the fallow-deer, while drinking, plunge and ose under water for a considerable time?
e it has two spiracula or breathing-places e nostrils; one at the inner corner of each g a communication with the nose.—*G. White.*

s stag-hunting in England formerly very pe-

e when the stag turned to bay, the ancient ent in upon, and killed or disabled, the des- imal. At certain times of the year this was cularly dangerous, a wound received from a n being then deemed poisonous, and more dangerous than one from the tusks of a boar, as the old rhyme testifies: —

'If thou be hurt with hart, it brings thee to thy bier,
But barber's hand will boar's hurt heal, thereof thou needst not fear.'
Sir Walter Scott.

Why do antlers differ from horns?

Because the antler is a real bone; it is formed in the same manner, and consists of the same elements as other bones. — *Notes to Blumenbach.*

Why is hartshorn jelly nutritious?

Because the horn of the stag contains a large proportion of gelatine.

Why is the deer poetically said to weep?

Because, in the heads of deer and antelopes, there are cavities imbedded in a bony case, and believed by French naturalists to be receptacles for tears, of which the thinner part evaporating, a substance remains, called by them, *larmes de cerf*, or deer's tears, the receptacles themselves being called *larmiers.*

Why is the deer as strong as he is fleet?

Because of the peculiar hardness of the bone of his foot.

Why is the fallow-deer often seen domesticated in stables?

Because he manifests a sort of affection for the horse.

Why were sheep formerly excluded from grazing on forests?

Because being such close grazers, they would pick out all the finest grasses, and hinder the deer from thriving. — *G. White.*

In the Holt, where a full stock of fallow-deer has been kept up till lately, no sheep are admitted to this day.

SWINE.

Why do swine roll themselves in mire?

Because they may protect themselves from flies,

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by the mud when dry; and not from any liking or inclination for uncleanness, particularly as no animal is more careful to have its bed clean and dry, than the pig. — *Rennie.*

THE ELEPHANT.

Why does the elephant move differently from the horse?

Because, without reckoning the joint which unites the hoof, the horse has three bones in the leg — the elephant has two. Thus the horse moves with an elastic pace, while the elephant has a grave or stiff progression; and this want of elasticity renders it disagreeable to ride on him for any distance. The peculiarity of his movement is generally attributed to the weight of the elephant's body, which, in some instances, is upwards of 5000lbs.

Why is the elephant one of the safest beasts of burden?

Because its step is so sure that it never stumbles, even on the worst roads.

Why is the elephant the natural inhabitant of rich plains, where vegetation attains its utmost luxuriance?

Because of the simple construction of his stomach and intestines, which require frequent supplies; of the great quantity of food which he consumes for his ordinary support; of the waste which is necessarily produced by the weight and bulk of his body; and of the conformation by which he is fitted to move on level ground.

Why are more cells filled with air in the skull of the elephant than in other animals?

Because the surface may be increased for the attachment of those large muscles which belong to the lower jaw, proboscis, and neck of the elephant, and the mechanical power of these muscles, may be augmented by removing their attachments further from the centre of motion. These air-cells do not increase the weight of the head; a precaution especially necessary in this instance, as the head is more heavy and massy in this than in any other animal. — *Lib. Ent. Knowledge.*

Why are the scent and hearing of the elephant remarkably acute?

Because, living in troops, but often dispersed for food, they may gather together without difficulty. Elephants are known to discover a tiger-track by the smell.

Why does not the elephant smell with his trunk?

Because the passage of any liquid through the canals of the trunk would not accord with the delicacy of the lining of the nostrils in the head. Thus man is in pain when any liquid enters the nose; and, in like manner the sense of smell does not exist in the nostrils of those animals that are constantly using them as a passage for water, as the whale. The sense of smell in the elephant is confined to that part of the nostrils which is enclosed in the bones of the head. — *Cuvier.*

Why does the elephant throw up his trunk when attacked by the tiger?

Because it may be as far as possible out of reach, and if the trunk be once scratched by the tiger, the elephant becomes ungovernable.

Why does the trunk of the elephant seize upon large and small objects with equal certainty?

Because the muscles of the trunk, which are nearly 40,000, have the power of distinct motion. — *Cuvier.*

Why, in crossing rivers, is the elephant safe when his body is completely immersed in water?

Because it is only necessary for him to bring the tip of his trunk to the surface, so as to breath the external air.

Why are the elephant's tusks now brought to Europe, of smaller size than formerly?

Because herds of elephants are scarce in the present day, and those which are found are unsparingly hunted for their ivory; so that probably few elephants live the natural term of their life.

Why are the tusks of the elephant teeth, and not horns, as was once supposed?

Because, although ivory, they are formed like other teeth by successive secretions from a pulpy root. The tusk does not adhere to this root, but is held in its socket as a nail is held in a plank, by the elasticity of the parts alone.

Why are the tusks of an elephant an uncertain standard for estimating his size?

Because the tusks grow throughout the life of the animal, and the body does not.

Why are the teeth of the elephant renewed when they are worn out?

Because he may masticate not only a larger quantity of food than other animals, but through a long series of years.—'The teeth of the elephant last a century: if the animal were to grow to double its present size, there is a provision for the continuance of the teeth; but as soon as the growth of the jaw is arrested, the succession of the teeth is arrested also, which fixes the duration of the animal's life.— *Sir E. Home.*

Why does the elephant sleep in a standing position, against a tree?

Because his tusks furnish him with support, and placing them against the tree, he relieves the weight which his head carries, and enjoys a partial repose with tolerable ease.

Why is the elephant a peaceable animal?

Because he subsists upon vegetable food, and therefore has neither the desire to destroy life, which characterizes the carnivorous animals, nor the means of gratifying such a desire.

Why is the elephant sometimes white?

Because it is an Albino: that is, an animal made white by disease.

Why is the general use of elephants forbidden at and near Calcutta?

Because they might occasion frequent accidents by frightening horses. — *Heber.*

Why is the white elephant part of the royal train at Ava?

Because the court and people would consider it as peculiarly inauspicious to want one of these animals; and the more there are, the more perfect is the kingly office considered. — *Craufurd's Travels.*

Why has the elephant superstitiously been considered a religious animal?

Because of an exaggerated notion of the animal's sagacity.

Why has the employment of the elephant been discontinued in modern warfare?

Because of his terror of fire-arms, which makes him unmanageable, and destructive of both friends and foes.

Why does the elephant appear more sagacious than he really is?

Because the facial line, or the vertical height of the skull, when compared with its horizontal length, is elevated by causes which have no connexion with the volume of the brain.

Why is the elephant proud of his trappings?

Because he is accustomed to wear them upon pompous ceremonials, where he receives impressions in unison with the parade of the scene.

Why is the elephant employed in hunting the tiger in India?

Because of his delicate scent, his strength to make way through the thickest covers, his sagacity, and especially his great stature, by which the hunter is lifted out of danger.

HIPPOPOTAMUS.

Why is the ivory tusk of the Hippopotamus preferred for artificial teeth?

Because it does not, from exposure to the air, turn yellow so soon as the ivory of the elephant, and is also at first harder and whiter.

THE RATEL.

Why is the subsistence of the ratel entirely on honey, doubted by naturalists?

Because its teeth correspond more closely with those of cats than any other quadruped, and exhibit a carnivorous character, scarcely, if at all, inferior to that of hyænas.

Why does the ratel attack bees with impunity?

Because of the roughness of its hide. Such is its tenacity of life, that 'it is a species of amusement for the farmers at the Cape, to run knives through different parts of its body, without being able for a length of time to deprive it of existence.' — *Barrow*

THE HORSE.

Why is the ear of the horse so interesting a part of his anatomy?

Because it is one of the most beautiful parts about him, and even more intelligible than the eye; and an observer of the horse can tell, by the expressive motion of the ears, almost all that he thinks or means.

Why is it a good sign for a horse to carry one ear forward and the other backward, when on a journey?

Because this stretching of the ears in contrary directions, shows that he is attentive to every thing that is taking place around him, and, while he is so doing, he cannot be much fatigued, or likely soon to become so. Few horses sleep without pointing their ears as above, that they may receive notice of the approach of objects in every direction.

'When horses or mules march in company at night, those in front direct their ears forwards; those in the rear direct them backwards; and those in the centre turn them laterally or across; the whole troop seeming thus to be actuated by one feeling, which watches the general safety. —*Arnott.*

Why does the eye of the horse point a little forwards from the side of the head?

Because the animal may have a more extended field of vision.

Why does not the loss of one eye enfeeble sight?

Because the other acquires greater energy; though it much contracts the field of vision. It is said to render the conception erring, and the case of misjudgment of distances is the one commonly brought forward to show this. One-eyed horses, have, however, been found extraordinary leapers.

Why is it a vulgar error to suppose wall-eyed horses not liable to blindness?

Because there is no difference of structure which can produce this exemption; but the wall-eyed horse, from this unseemly appearance, and his frequent want of breeding, may not be exposed to many of the usual causes of inflammation.

Why does the pupil of the eye expand when a horse is brought to the door of the stable?

Because it may keep out the extra quantity of light, which would be painful to the animal and injurious to vision. When opposed directly to the sun, the pupil, or aperture in the iris, will almost close.

Why was the inflammation of the horse's eye formerly called 'moon-blindness?'

Because of its periodical return, and some supposed influence of the moon; an absurdity which is its own contradiction.

Why are the eyes of horses kept clean?

Because like birds, they have a kind of third eyelid, called the *haw*, moistened with a pulpy substance or mucilage, to take hold of the dust on the eye-ball, and wipe it clean; so that the eye is hardly ever seen with any thing on it, though greatly exposed from its size and posture.

Why do horses shy as they grow old?

Because of a decay in their sight; a loss of convexity in the eye, lessening the convergency of the rays, and throwing the perfect image beyond, and not on the retina.

Why are the teeth a criterion of the horse's age?

Because the incisor or front teeth of the horse have a production of enamel in their centre; but the cavity which this forms, containing no cement, is merely filled by the particles of food, &c. As the enamel descends only to a certain extent in the tooth, the teeth disappear at last, from the constant wear of the part in mastication; and this is improperly called the filling up of the teeth. — *Blumenbach.*

Why are the grinders of the horse never perfect?

Because the tooth is not finished when it cuts the gum: the lower part of its body is complete, while the upper part is worn away by mastication, and the proper fang is not added till long after. Thus, if the part out of the gum is complete, the rest of the body is imperfect, and there are no fangs: on the contrary, when the fangs are formed, much of the body has been worn away in mastication. — *Blumenbach.*

Why has the horse the pack-wax, or a strong cord from the back of the head to the bones of the back?

Because the head hangs in a slanting position from the extremity of the neck, and the neck itself projects considerably from the chest; thus the whole weight of the head and neck is suspended from the chest, and very great power is requisite to support them. In addition to the simple weight of the head and neck, the neck projecting from the chest, and the head hanging from the extremity of the neck, act with enormous mechanical force, and require more than a hundred-fold the power necessary to support them.

As an illustration, it may be observed, that it requires a strong man to lift a small table from the ground at arm's-length.

Why are large nostrils a perfection in hunters and running horses?

Because they afford the animals freer respiration when they are hard-ridden or run. — *G. White.*

Why are horses with white legs and feet less valuable than those which have them not?

Because, even in a wet soil and climate, white hoofs are more brittle, and more liable to accident and lameness than black ones; and in stony soils white hoofs are much more liable to break and to contract than those of a dark colour.

Why is it difficult to distinguish the species of a horse from the inspection of his bones?

Because the size can scarcely be assumed as a specific character, it varying remarkably in the same species. Hence the bones of fossil horses present no precise character to distinguish them from the medium-sized existing species.

Why does a bulky, heavy horse make less progress than a compact muscular animal?

Because the fat horse makes but little exertion, much of his force being expended in transporting his own overgrown mass.

Why does the speed and wind of the horse depend on the size of the lungs?

Because in proportion to the quantity of air which they contain, and the less frequent necessity of renewing that air by breathing, will the animal be at his ease, or distressed, when violent exertion is demanded of him.

Why does the rider sit almost undisturbed on the back of a fast-going horse?

Because the back is divided into numerous bones, and between each pair there is a highly elastic substance, which will yield and give way to every jar,—

forming altogether a springy mass. If the back were of unyielding materials, if it resembled a bar of wood or iron, the jar or jolting, in the rapid motion of the animal, could not possibly be endured.

Why is a long-backed horse easy in his paces?

Because the increased distance between the fore and hind legs, which are the supports of the spine, will afford greater room for the play of the joints of the back. A long spring has much more play than a short one. And will better obviate concussion.

Why does a horse improve his pace when whipped on the hips?

Because his organ of touch is situated in the hips, which are furnished with many nerves.

Why does a horse grunt when exercised on a full stomach?

Because the pressure of the stomach on the lungs impedes the breathing.

Why are jockies correct in the term 'blood and bone,' to distinguish the breed and genealogy of horses?

Because blood is an allowable term for the race, and bone is so far significant, that the bone of a running-horseis remarkablycompact,compared with the bone of a draught-horse. It will be readily understood, that the space in the gallop must give a shock in proportion to its length; the greater the muscular power, the denser and stronger is the bone.

Why do jockies judge of a horse by his sinews or tendons?

Because the condition of the tendon indicates the state of the muscle; the muscular fibres forming what is termed the belly of the muscle, and the tendon through which the muscle pulls, being two parts of one organ. Strong muscles being powerful contractors, cause high and round action, and such horses are safe to ride. Their feet are generally preserved good, owing to the pressure they sustain from their high action. But this excellence in a horse will not make him a favourite at Newmarket. The circular motion cannot be the swiftest: a blood horse carries his foot near the ground.

Why is strength of sinew in the fore-legs essential to the speed of a horse?

Because the feet may be well thrown out before; for if these sinews be not strong, the jonts will be unable to sustain the weight of his body, when powerfully thrown forward, by the exertion of his hind-quarters, and he will be apt to come with his nose to the ground.

FOREIGN HORSES.

Why does the Arabian horse probably differ least from the native stock, and rank first in our domestic races?

Because, instead of crossing the breed, as we so frequently do, the Arabs take every precaution to keep it pure and unmixed. They preserve, with the greatest care, the genealogies of their horses: those of the first kind are called *nobles*, being 'of a pure and ancient race, purer than milk;' two other kinds, which have been degraded by common alliances, sell at lower prices. The Arabs say the genealogy of their finest horses is known for 2000 years.

The Greek sporting-men held the same opinion, long before the Arab horse was known. 'What chance have I of winning?' inquired a youth whose horse was about to start on the Olympic course. 'Ask the *dam* of your horse,' was the experienced reply.

Why are the horse and the ass used by the Arabians and Tartars to discover springs in the desert?

Because both these animals are, in some measure, aware of the existence of water from a great distance. — *Wilson, in the Quarterly Journ. Agriculture.*

Why are the horses of Arabia, Persia, and Barbary, the most beautiful and perfect of their kind?

Because of the fine climate of those countries, where the heavens are almost perpetually serene; the atmosphere is very dry, and the soil light, and for the most part sandy. In Europe, the Spanish breed, which enjoys a climate less different from that of the east than most European countries, is *naturally* the finest on our continent. The strength, beauty, and swiftness of English horses are rather to be attributed to the wealth, perseverance, and peculiar fancies of the English nation, than to any natural advantages of climate. — *Wilson.*

Why is a certain species of horse called a Barb?

Because the breed is from Barbary, in Africa.

Why do the Arabs reckon the genealogies of their horses from the mothers?

Because the female is more concerned than the male in the excellence and value of the produce.

Why has the Arab horse an apparent sagacity seldom seen in other breeds?

Because of the kindness with which he is treated from a foal. The mare and the foal inhabit the same tent with the Bedouin and his children; and the animal acquires that friendship and love for man which occasional ill-treatment will not cause him to forget.

Bishop Heber says his Arab horse had 'almost as much attachment and coaxing ways as a dog. This seems the general character of the Arab horse. It is not the fiery dashing animal I had supposed, but with more rationality about him, and more apparent confidence in him, than the majority of English horses.'

Why are the wild horses in the plains of America, to the south of the Rio de la Plata, called 'insurgent.'

Because, in troops sometimes of 10,000 individuals, preceded by videttes and detached skirmishers, they advance in a close column, which nothing can break. If a travelling carriage, or a body of cavalry is perceived approaching, the leaders of the wild horses advance upon a reconnoissance, and then, according to the movements of the chief, the whole body passes at a gallop, to the right or left of the caravan; inviting, at the same time, the domestic horses to desertion. The latter often join their late companions and are never again observed voluntarily to return to the domestic state. These wild troops often return again with a threatening aspect, sweeping round the caravan, or hovering near it like a cloud. At other times, they describe a single bold circle, and, after uttering a cry of defiance, they disappear over the wilderness. Each of these great squadrons is composed of a reunion of small companies, separately formed of as many mares as a single horse is able to keep in subjection. — *Wilson.*

Why do wild horses, in travelling to a distant pasture, always run against the wind?

Because they may be more speedily apprized of whatever danger may await them in their intended course.

Why are the horses of Sweden finely limbed and sure-footed, notwithstanding the cold and moist climate?

Because of the great precautions used to defend them from humidity, even in the stable; by which means they are preserved from those defluxions which so frequently attack horses in moist climates.

THE BRITISH HORSE.

Why are English race-horses named 'first blood'?

Because they are as near as possible to the foreign stock.

Why is the great Lincolnshire black horse now but rare in the cavalry of England?

Because, in active service, its great size renders it unwieldy; wherefore, others of a smaller but more active kind are preferred.

Why has the Suffolk Punch immense power?

Because the low position of his shoulder enables him to throw so much of his weight into the collar.

Why is the Clydesdale horse so called?

Because it is principally bred in a district on the Clyde, in Scotland.

Why is the Galloway so called?

Because of its origin from a breed of horses once found in the south of Scotland, on the shore of the Solway Frith.

Why is the Irish horse generally smaller than the English?

Because he is stinted in his growth, from the poverty and custom of the country imposing on him much hard work, when he is unfit for labour of any kind.

Why is the leaping of an Irish horse superior to the English?

Because the leap of the Irish horse is the proper jump of the deer; whereas the leaping of the English is striding, as it were, over a low fence, and stretching at his full length over a higher one.

Why was horsemanship, in former times, of a higher order than in the present day?

Because its objects, war and gallantry, with their attendant virtues, courage and chivalric honour, were more ennobling in their effects than the gambling zeal of St Leger.

Why are bells placed on horses?

Because they were a favourite addition to the equipment of a horse in the early times of chivalry. An old Troubadour poet, Arnold of Marsan, states very grave reasons for wearing them. He says, 'Let the neck of the knight's horse be garnished with bells, well hung. Nothing is more proper to inspire confidence in a knight, and terror to an enemy. The war-horse of a soldier of a religious order of knighthood might have his collar of bells, for their jangling was loved by a monk himself—

And when he rode, men might his bridle hear,
Gingleing in a whistling wind as clere,
And eke as loud as doth the chapel bell.

Why were the old English war horses necessarily very heavy?

Because the soldier was cased in ponderous armour, and the knight, with all his accoutrements, often rode more than 25 stone. No little bulk and strength were therefore required in the animal destined to carry this back-breaking weight.

Why was the price of the English horse formerly regulated by proclamation?

Because breeders and dealers, then, as now, skilful in imposing on the inexperienced, obtained from many of our young grandees enormous prices. Such was the value of English horses in 1386, when Richard I issued a proclamation for the above purpose.

Why is the use of the pack-horse discontinued?

Because of the great modern improvements in roads and carriages.

The gigantic proportions and immense powers of our dray-horses are only equalled by their intelligence and docility. It may safely be said, that this breed of horses is not to be paralleled on the face of the earth.— *Cuvier.*

One of our powerful draught horses of London, will draw, for a short distance, the enormous weight of three tons.

Why is horse-racing less cruel than is generally imagined?

Because the horse enters into the spirit of the race as thoroughly as does his rider: indeed, the jockey becomes a part and portion of him; every motion of his arms and body corresponding with and assisting the action of the horse.

Why do we use the phrase of 'bearing away the bell?'

Because the prize in horse-racing was, formerly, a wooden bell adorned with flowers. This was afterwards changed for a silver bell, and 'given to him who should run the best and furthest on horseback, on Shrove Tuesday.'

Why are horses so short-lived in England?

Because of the absurd practice of running our race-horses at two or three years old, working others long before their limbs are knit, or their strength come, and cruelly exacting from them services far beyond their powers. Their age does not average eleven years. Cuvier says that 'it may safely be asserted, that more horses are consumed in England, in every ten years, than in any other country in the world, in ten times that period, except those which perish in war.'

Why does the pace kill horses in posting?

Because a horse at a dead pull, or at the beginning of his pull, is enabled, by the force of his muscles, to throw a certain weight into the collar. If he walk four miles in the hour, some part of that muscular energy must be expended in the act of walking; and, consequently, the power of drawing must be proportionally diminished. If he trot eight miles in the hour, more animal power is expended in the trot, and less remains for the draught; but the draught continues the same, and to enable him to accomplish this work, he must tax his energies to a degree that is cruel in itself, and that must speedily wear him out.

THE ZEBRA.

Why was the zebra called by the Romans a hippo-tiger, or horse-tiger?

Because it possesses the proportions of a horse, with the striped hide of a tiger.

THE ASS.

Why does the ass choose the narrow and irregular paths by the way side?

Because his natural locality is the mountains, and this choice is probably a remnant of instinct. The base on which he is sustained, while walking, is extremely narrow, and is produced by the vertical compression of the body, — from which necessarily results greater sureness of foot, while moving rapidly over a narrow surface, than is to be found in those animals whose feet touch the gnound at proportionally greater distances. — *Wilson.*

Why are the hind quarters of the ass naturally several inches higher than its fore ones?

Because it is a mountain animal, and this inequality, as in the hare, facilitates its ascent of steep heights.

Why is the skin of the ass called 'chagrin,' corrupted into shagreen?

Because of its derivation from the Turkish *sagri.* — *Wilson.*

Its engrained appearance is not, however, natural to it, but is produced by a chemical process.

Why is an ass, eating thistles, vulgarly thought emblematical of the ridiculous?

Because it is related that Crassus, a distinguished Roman, never laughed in his life but once, and that at an ass eating thistles: 'a circumstance,' says Dr Shaw, 'by no means ridiculous.'

THE MULE.

Why does the mule bray like the ass?

Because it possesses exactly the same larynx as the ass, without any of the peculiar vocal organs of the mare or mother.

THE MOLE.

Why has it been asserted that the mole does not see?

Because, although naturalists have found the eye, anatomists do not find the optic nerve, which, in other animals, serves to transmit the visual sensation to the brain.

Why is not this nerve evident in the mole?

Because it is prevented, by the great extension of the olfactory apparatus, from following the course which is taken in other animals.

The eye of the mole is very small, in the bulk, at the most, of a grain of millet; in colour, ebony, and hard to the touch. Besides the eye-lid which covers it, it is protected by long hairs, which, crossing one another in all directions, form a thick and closely-woven band.

Why does the breast bone of the mole in shape resemble a plough-share?

Because it may assist the animal in digging under ground.

Why does the fine fur of the mole yield in every direction, and offer no resistance to the touch?

Because the mole may not be impeded in its retreat, while retiring backwards, as it always does upon suspicion of peril, not turning round, which the size of its runs does not permit, but tail foremost, until it arrives at some collateral gallery, when its flight is head foremost, as with other creatures. If this fur had been strong, as in the rat or mouse, it would doubly have retarded the progress of the creature: first, by its resistance, and then, acting as a brush, so as to choke up the galleries, by removing the loose earth from the sides and ceilings of the arched ways.—*Knapp.*

Why is the smell of the flesh of the mole remarkably offensive?

Because its sole food is worms.

It is doubtful whether any other animal exists, which is obliged to eat at such short intervals as the mole. Ten or twelve hours appear to be the maximum of its fasting; at the end of that time, it dies. They are essentially carnivorous: Cuvier tells us that if two moles are shut up together without food, there will shortly be nothing left of the weakest, but its skin, slit along the belly.

Why do mole-catchers draw the body of a captured *mole through their traps, and the adjoining runs and passages?*

Because they may remove all suspicious odours, which might arise from the touch of their fingers, the mole's sense of smelling being unusually acute.—*Knapp.*

Why do mole-catchers tread lightly when in quest of moles?

Because the feeling of the mole is so acute, that, when casting up the earth, it is sensible of the pressure of a very gentle foot; and unless this caution is used, it ceases from its operation, and instantly retires.—*Knapp.*

Why are moles said to be beneficial to vegetation?

Because they loosen the soil about the roots of plants. Evelyn and others censure them as injurious; and Buffon accuses them of eating all the acorns of a newly-set soil.

Why are some mole-hills considerably larger than others?

Because the nest or den of the mole is beneath.

Why are there no moles in Ireland?

Because, it is supposed, of the dampness of the soil.

THE BEAVER.

Why have beavers very powerful incisor teeth?

Because they may strip off and divide the bark of the trees, which forms their principal nutriment, and gnaw through thick trunks to obtain the timber for building their habitations. Their teeth are re-produced from the base as fast as they are worn down at the extremity. By good authority it is stated that a beaver will lop off with his teeth, at a single effort, a stem of the thickness of a common walking-stick, as cleanly as if done by a gardener's pruning-knife.

Why has the beaver a long, broad, flat tail?

Because it may serve in the water, as a paddle and a rudder, to urge them onwards and to direct them in their course. The stories of the beaver using its tail as a sledge, and as a trowel, are impositions on the credulous. The tail is altogether unfitted for such operations: for mixing up the mud with the rest of the materials, it employs the fore-paws and the mouth. — *Sec. Zoolog. Soc.*

Why is the winter season preferred for taking beavers?

Because the winter coat is far superior to the summer. The skin of the young or cub-beaver is the darkest and most glossy, and consequently the most valuable.

Why was the fur of the beaver universally used, at an early period, for making hats?

Because of a proclamation issued in the year 1638, forbidding the use of any materials in making hats, except beaver stuff or beaver wool.

Why do the hind feet of the beaver turn in?

Because it may keep its fur in order, and cleanse it from dirt and moisture, which the beaver could not do if the toes were straight.

THE SEAL.

Why does the seal see equally well under water, as in air?

Because it can lengthen or shorten the axis of the organ of sight at pleasure, and thus see equally well in two media of very different density, viz, air and water.

Why is a species of seal called the sea-lion?

Because of the lion-like mane of the male.

Why is another species of seal called the sea-elephant?

Because it has a nose resembling the proboscis of the elephant.

Why is the nose of the seal considered by physiologists to be the most perfect nose belonging to the class of quadrupeds?

Because it has been computed that the smelling surface in the nose of a single seal amounts to the enormous quantity of 240 square inches.

Why is the seal so valuable to the Esquimaux?

Because it furnishes food for his table, oil for his lamp, clothing for his person; even the bones and skins of seals supply materials for his light portable boats, and his summer tents.

Why is the domestication of the seal much easier than that of other animals?

Because its brain is of greater proportionate magnitude than in any other quadruped, and not only does it exhibit in its countenance the appearance of sagacity, but its intelligence is in reality far greater than in most land quadrupeds. It is likewise susceptible of more powerful attachment, and Dr Harwood observes, that, aware of its disposition to become familiar, and this participation in the good qualities of the dog, it is astonishing that mankind have not chosen this intellectual and finely organized quadruped, for aquatic services, scarcely less important than some of those in which the dog is employed on land. — *Brande's Journal.*

THE ORNITHORYNCUS.

Why is the ornithoryncus called the duck-billed animal?

Because it is distinguished from all mammiferous animals yet known by the unprecedented formation of its jaws, which closely resemble the broad flat bill of a duck, are covered in the same way with a soft membrane, plentifully supplied with nerves for tasting, and also, like it, serrated at the natural edges. The feet are provided with webs, which, in the front ones, project beyond the claws, and can by that means be folded up or expanded like a fan. No appearance of teats has hitherto been discovered in either sex. This wonderful animal lives near the lakes about Botany Bay, in the fifth part of the world, so rich in creatures of remarkable formation. — *Blumenbach.*

THE WALRUS.

Why is the great walrus able to climb slippery rocks?

Because its hind feet are constructed upon a mechanism resembling cupping-glasses.

Why is the walrus supposed to have been mistaken for a mermaid?

Because the front face, when seen at a little distance, has a striking resemblance to the human countenance.

Why does the walrus lie on the ice of the Arctic regions, without inconvenience?

Because, as a defence against the extreme cold, it has not only a skin an inch thick, covered with close hair, but a coating of oily fat, completely enveloping the body.

MERMAIDS.

Why is the dugong believed to be the mermaid of early writers?

Because, of all the cetacea it approaches the nearest in form to man; and when its head and breast are raised above the water, and its pectoral fins, resembling hands, are visible, the dugong might easily be taken by superstitious seamen for a semi-human being. The dugong is the only animal yet known that grazes at the bottom of the sea without legs. It is of the form and figure of the whale. The position and structure of the mouth enable it to browse like a cow in a meadow, and the whole structure of the masticating and digestive organs, shows it to live entirely on vegetables. It never comes on the land, or into fresh water, but frequents shallow inlets of the sea of two or three fathoms deep. The length of the dugong is eight or nine feet, and the flesh, when cooked, entirely resembles young and excellent beef.

The manatus, or lamantine is said to carry its young between its paws, and when viewed in this attitude, it may have given rise to the belief in the mermaid.

THE WHALE.

Why is the whale so called?

Because of its derivation from *wal-fisch*, or *wallow* fish.

Why are whales classed with mammalia?

Because, although their home be entirely in the depth of the waters, they have several features in common with the larger quadrupeds.

Why is the whale not a fish?

Because its lungs, heart, intestines, &c, resemble those of quadrupeds; they breathe by lungs, not by gills; suckle their young; have no scales, and a horizontal tail, the reverse of fishes.

The whale is the largest of all known animals, weighing upwards of one hundred thousand pounds. Those that are taken at the present day are rarely longer than from sixty to seventy feet.

Why are the whale tribe called Cetacea, or Cetaceous animals?

Because *Cete* in Latin signifies whales.

Why are whales and other cetacea without the lacrymal apparatus?

Because their eyes are preserved in a moist state by the element in which they live.

Why is the brain of the cetaceous tribe considered small in comparison with the size of the body?

Because the brain of a common whale, nineteen feet in length, has been found by Mr Scoresby to weigh about 3¾ pounds, although the weight of the animal was nearly 11,200lbs. Here the weight of the brain was about one-thousandth part of that of the body, whilst that of the brain of an adult man is about 4lb, and that of the body 140, the brain the one-thirty-fifth part of the weight of the whole body. — *Notes to Blumenbach.*

Why do whales rise to the surface of the water to breathe?

Because they have a heart with two ventricles (or cavities,) and lungs through which they respire; and are unable to separate the air from the water, as fishes do by means of their gills. Hence it is a vulgar error to call the whale a fish; yet he is entirely an inhabitant of the sea, having a tail, while his front limbs much more resemble fins than legs, and are solely used for pawing the deep.

Why has the whale blowing holes on the head?

Because they may serve for respiration, and for the rejection of water which enters with the food. In consequence of their situation at the top of the head, the water is easily elevated beyond the surface of the sea, while the mouth is usually under water.

Mr Scoresby has ascertained that these blowing-holes emit only a moist vapour, and are huge nostrils. When this vehement breathing or blowing is performed under the surface, much water is thrown out into the air. The sound thus occasioned is the only similitude of a voice emitted by the animal; and, in the case of a violent respiration, it resembles the discharge of a cannon.

Why are the breast-fins of a whale called hands?

Because, instead of being composed of straight spines like those of fishes, they conceal bones and muscles formed very like the fore-legs of land-animals; but so enveloped in dense skin, that the fingers have no separate motion, though the *hand* is flat, very pliant, large and strong, enabling the whale to sustain the young closely compressed to its body, as was remarked by Aristotle. — *Dr Harwood.*

Why do the fins or swimming paws of the whale serve as a helm rather than as oars?

Because, while the whale swims, the fins lie flat on the surface of the water, and are not instrumental in producing its motion, which arises entirely from the tail.—*(Scoresby.)* Such is the spring and vitality of these fins, that, if we may believe De Reste, they continue to move for some time after being separated from the body.

Why is the globe of the eye of the whale nearly spherical, and projecting through the iris?

Because there may be little or no room left for aqueous humour, the whale being so much under water. The aqueous humour being of the same density with the water, would there have no power of refracting rays of light: its place is therefore supplied by an increased sphericity of the lens.—*Notes to Blumenbach.*

Why has the tail of the whale such tremendous power?

Because it consists of two beds of muscles connected with an extensive layer surrounding the body, and enclosed by a thin covering of blubber. It does not rise vertically like that of most fishes, being flat and horizontal, only four or five feet long, but more than twenty feet broad. A single stroke will throw a large boat with all its crew into the air.

Why is the body of the whale surrounded with blubber?

Because it may be enabled to defy the most dreadful extremities of cold, and to preserve a strong animal heat, even under the eternal ice of the Pole.

Why is the palate of the whale covered with baleen? (improperly termed whalebone).

Because it may strain the water, which the whale takes into its large mouth, and retain the small animals on which it subsists. For this purpose the baleen is in the form of sub-triangular plates, with the free edge fringed towards the mouth, the fixed edge attached to the palate, the broad end fixed to the gum, and the apex (or point) to the inside arch. These plates are placed across each other at regular distances. — *Fleming's Philosophy of Zoology.*

Why are the whales seen in the greatest numbers in the olive waters of the Greenland sea?

Because of the incalculable number of medusæ, or animalculæ in these waters, which occupy about a fourth of the Greenland sea, or above 20,000 square miles. The whales cannot derive any direct subsistence from the animalculæ; but these form the food of other minute creatures, which then support others, till at length animals are produced of such size as to afford a morsel for their mighty devourers.

Mr Scoresby estimates that two square miles of these waters contain 23,888,000,000,000,000 animalculæ; and, as this number is beyond the range of human words and conceptions, he illustrates it by observing that 80,000 persons would have been employed since the creation in counting it.

Why is a certain species of whale called razor-back?

Because it has a horny protuberance or fin at the extremity of the back, which part of the body rises into a narrow ridge.

Why is it an error to suppose that the great northern whale feeds on herrings?

Because the structure of its throat and mouth prevent it from swallowing so large a fish; it has no teeth, and its throat is very narrow. Its food is marine worms and insects taken into its mouth with a volume of water, and strained through the fibres of the whalebone fixed in its palate.

The whale that pursues the herrings on the coast of Scotland, is the bottle-nose, an animal of very different anatomy and habits from the great northern whale. — *Notes in various Sciences.*

Why do whalers first attack the suckers or young of the whale?

Because they are under the assurance that the mother will start forth in her own defence.

Why is the white whale more valuable than any other species?

Because it yields spermaceti; which is found in the form of a milk-white oil, in the body, near the blubber, and in cavities on the head. On exposure to the air, it hardens into a semi-transparent kind of tallow. The blubber yields sperm oil: and ambergris is formed in the large intestines when the whale is diseased.

One of this species was taken in 1829, near Whitstable; measuring sixty-two feet in length, and sixty-two feet in height: the oil from which was worth 720*l*, exclusive of the spermaceti.

THE NARWHALE.

Why has the narwhale been called the sea-unicorn?

Because it has been very frequently found with only one tusk. Yet there can be no doubt that it possessed originally two of these, one in either jawbone; and that which is wanting must have been lost by accident, as we can easily suppose. — *Shaw.*

Why was it supposed that the female narwhale had no tusks?

Because the tusks in the female come much later than in the male. Linnæus, and the captains of the Greenland ships fell into this error; but the question has since been decided as above, by Sir E. Home.

THE DOLPHIN.

Why was the dolphin said by the ancients to be attached to man?

Because it is known to accompany ships to considerable distances, as does the shark, but with different motives.

GENERAL ECONOMY.

Why are mammiferous animals the most useful to man?

Because of the difference in their forms, their great docility and their strength. From no other class of animals has man been able to obtain such faithful, serviceable, and valuable assistants; no others are so indispensable to him for his immediate use and support. Whole nations are enabled to supply nearly all their most urgent necessities with a single species of mammiferous animals: — the Greenlanders, with the seal; the Laplanders, Tunguses, &c, with the rein-deer; the Aleutians with the whale.

The various uses of mammiferous animals to man, may be classed as follows: — for riding, draught, husbandry, carrying burdens — the horse, mule, ass, ox, buffalo, rein-deer, elephant, camel, llama, dog. For hunting and watching — the dog. For destroying mice and other vermin — the cat, hedgehog, ant-eater. For food — the flesh of oxen, the sheep, goat, swine, the deer genus, hare, rabbit, besides lard, tallow, blood, milk, butter and cheese. For covering and clothing, — furs, leather, hair, wool. For fuel and burning — tallow, train-oil, spermaceti. For writing, bookbinding, &c, — parchment, leather. For other miscellaneous uses — bristles, hair, antlers, horns, hoofs, ivory, teeth, bone, whalebone, bladders. For glue — guts, tendons, and bones. For strings — guts, (cat gut). Blood for Prussian blue and other colours. Bones and hoofs for ivory black, &c. Fat and marrow for soap. Excrement for manure, fuel, sal ammoniac, &c. Lastly, for medicines — musk, castor, hartshorn, milk, and other articles. — *Blumenbach.*

Why may several animals of this kind be also said to be directly or indirectly injurious to man?

Because many carnivorous animals, particularly of the cat tribe, attack him. These, and many others, as the weasel, marten, polecat, glutton, otter, and whale, destroy serviceable animals, or injure trees, plants, fruit, corn, &c, as the field-mouse, hamster, lemming, deer, hare, beaver, monkey, elephant, rhinoceros, hippopotamus: — or consume our provisions — as the rat, mouse, and bat. No animal of this class appears to be venomous when in a state of health, except, perhaps, the male of the duck-billed animal, (*ornithorincus*) the spur on the hinder leg of which is considered poisonous. — ***Blumenbach.***

Why are the skins of animals steeped in the infusions of certain barks for forming leather?

Because the skins being previously prepared by soaking in lime-water, which renders the cuticle and hair easily separable, and afterwards softened by allowing them to enter into a degree of putrefaction, — the action of infusion of oak-bark, or other astringent vegetable matter, is increased until a complete combination has taken place, which is known by the leather being of an uniform brown colour, throughout; whereas, in imperfectly tanned leather a white streak is perceptible in the centre. — ***Brande.*** — Such is the process of tanning.

Why is leather curried with oil while moist?

Because, as the humidity evaporates, the oil penetrates into the pores of the skin, giving it a peculiar suppleness, and making it, to a considerable extent, water-proof. As familiar examples of this and the preceding processes, the thick sole-leather for shoes and boots is *tanned;* the upper leather is *tanned and curried.* — *Aikin.*

Why is it commonly supposed that the flesh of young animals contains more gelatine than that of old ones?

Because the young flesh is merely more soluble and more easily extracted by boiling.

Why, in making animal jelly, is simmering preferable to boiling?

ause, by boiling, the albumen is so firmly co-
ed as to envelope the gelatine and protect it
he solvent power of water; whereas, simmer-
a temperature from 100 to 120 removes from
uscle the whole of the jelly.—*Brande.*

have all animals more or less fat?

ause it may serve as a store of nourishment;
most abundant, when the animal is well fur-
l with a copious supply of food, and gradually
shing in quantity as the food becomes scarcer,
sappearing when, from want, a lingering death
en produced.—*Fleming's Zoology.*

is it necessary to vary the food of animals?

ause the stomach, like other organs, can be
d to the due performance of its functions only
plying it with an appropriate stimulus. The
alimentary substance long continued probably
its stimulating power, and thus, though it
d with nutritive properties, the stomach is in-
le of acting upon it.

does the blood of different animals vary in smell?

ause the blood of each species contains a prin-
eculiar to each, which is very volatile, and has
ur resembling the sweat or exhalations of the
l. This principle may be separated by a very
process;* when it will appear that the blood
ox has a strong odour of the perspiration of
rse; that of the sheep, a strong odour of wool,
gnated with the perspiration of that animal;
the dog, the odour of the transpiration of a
at of a pig, the disagreeable odour of a pig-
that of a rat, the bad odour belonging to a rat.
m the French of M. Barual.

a few drops of blood into a glass, to which add one-third or
nuch concentrated sulphuric acid, and stir the whole together
ibe, when the odoriferous principle will be exhaled.

Why are there great changes in animals on their introduction into a new country?

Because every animal appears, like man, to require time to accustom itself to climate. Thus, in America the hog multiplies very rapidly, and assumes much of the character of the wild boar. Cows did not at first thrive, but in St Domingo, only twenty-seven years after its first discovery, 4,000 in a herd was not uncommon. Cows never thrive nor multiply where salt is wanting either in the plants or in the water. They give less milk in America, and do not give milk at all if the calves be taken from them. Among horses the colts have all the amble as those in Europe have the trot: this is probably an hereditary effect. Bright chestnut is the prevailing colour among the horses. The lambs which are not from *merinos*, at first are covered with wool, and when this is timely shorn it grows again; if the proper time is allowed to elapse, the wool falls off, and is succeeded by short, shining, close hair, like that of the goat in the same climate.

Why is it concluded that no large species of animals remains to be discovered in America?

Because there is no good reason assignable why any such should exist in that country, with which we are acquainted; and in fact, none have been discovered there during the last 150 years.

Why are not the bones uniform in shape?

Because each bone is not, as a mere pillar, intended to bear a perpendicular weight; but, according to its place, bears up against the various forces which are applied to it; and is expanded at the head to give a greater, and consequently a more secure surface for the joint, while its form regulates the direction in which the joint is to move. Archdeacon Paley has, with great propriety, instanced the form of the ends of bones, as proving design in the mechanism of a joint.

Why do certain animals change co'our?

Because of the effects of age and climate. Thus, the seal changes colour with his age. Many also become either gray, as the squirrel, or snow-white, as the ermine; with us, merely during the depth of winter, but in the north, throughout the whole. — *Blumenbach.*

Why have ruminating animals a four-fold stomach?

Because its remarkable structure and mechanism may assist the rumination of their food. Thus the food, when first swallowed, and in a half crude state, is received into the immense *first stomach*, as into a storehouse in which it is only a little softened. From it small portions of food are successively taken up by the *second stomach*, which appears merely an appendage to the first, and propelled a second time through the gullet into the mouth. Next, the food, after being again chewed, is carried by a particular groove direct from the gullet into the *third stomach*, without passing through the two first; lastly, it is transmitted to be completely digested in the *fourth*, which approaches most closely to the stomach of other mammiferous animals.

DOMESTICATION.

Why does domestication produce certain variations in animals?

Because of the degrees of slavery and subjection under which those animals are to man. They do not proceed in half-domesticated species. In the cat, for example, a softer or harsher fur, more brilliant or more varied colours, greater or less size — these form the whole extent of the varieties in the species: the skeleton of the cat of Angora differs in no regular or constant circumstances from the wild cat of Europe.

Why are the most remarkable variations produced in the dog?

Because that animal is most completely under the subjection of man; and dogs having been trans ed by mankind into every part of the world, submitted their actions to his entire direction. gulated in their breeding by the pleasure or ca of their masters, the almost endless variety of differ from each other in colour; in length abundance of hair, which is sometimes en wanting; in their natural instincts; in size, v varies in measure as one to five; amountin some instances to more than an hundred-fo bulk; in the forms of their ears, noses, and in the relative lengths of their legs; in the pro sive development of the brain, in several of th mesticated varieties, occasioning alterations ev the form of the head; some of them having slender muzzles with a flat forehead, others h short muzzles, with the forehead convex, &c somuch that the apparent differences betwe mastiff and a water-spaniel, and between a hound and a pug-dog, are even more striking between almost any of the wild species of a g Finally, and this may be considered as the maxi of known variation in the animal kingdom, races of dogs have an additional claw on each foot, with corresponding bones of the tarsus o step; as there sometimes occur in the human cies, some families that have six fingers on hand. Yet, in all these varieties, the relatio the bones with each other remain essentiall same, and the form of the teeth never percep changes, except that in some individuals one tional false grinder occasionally appears, somet on the one side, and sometimes on the other. — *vier.*

FABULOUS ANIMALS.

Why are the unknown animals of the ancients lous?

Because the greater number of them have an ori-
in purely mythological ; and of this origin the de-
riptions given of them bear the most unequivocal
arks ; as, in almost all of them, we merely see the
ifferent parts of known animals united by an un-
ridled imagination, and in contradiction to every
stablished law of nature. Learned men may at-
mpt to decypher the mystic knowledge connected
nder the form of the sphynx of Thebes, the pega-
s of Thessaly, the minotaur of Crete, or the chi-
era of Epirus ; but it would be folly to expect se-
ously to find such monsters in nature. We might
s well endeavour to find the animals of Daniel,
r the beasts of the Apocalypse, in some hitherto
nexplored recesses of the globe. Neither can we
ok for the mythological animals of the Persians,
-such as the *martichore*, or destroyer of men, hav-
g a head on the body of a lion, and the tail of a
corpion ; the griffin, or guardian of hidden trea-
ures, half eagle and half lion ; or the *cartazonon*,
r wild ass, armed with a long horn on its forehead.
tesias, who reports these as actual living animals,
as been looked upon by some as an inventor of
ables; whereas he only attributes real existence to
ieroglyphical representations. — *Cuvier.*

The fables of men with tails, of the natural apron
f the Hottentot women, of the supposed natural
leficiency of beard in the Americans, syrens, cen-
aurs, &c, can only be excused by the simple, easy,
redulity of our ancestors. — *Blumenbach.*

*Why was the existence of men with tails formerly
redited ?*

Because of its origin from old and scarcely re-
ognizable representations of the Wanderow mon-
ey, thus transformed by the embellishments of
ubsequent copyists. — *Blumenbach.*

*Why are cynocephali, or dog-headed baboons, satyrs
nd sphinxes, celebrated in Egyptian antiquities ?*

Because they were furnished by fantastic representations on the ancient monuments of Egypt, in which the parts of different kinds of creatures are strangely combined,—men with the heads of animals, and animals with the heads of men.— *Cuvier.*

Why was the fable of pigmies credited?

Because of the custom of exhibiting in the same sculpture, in bas-relief, men of very different heights, of making kings and conquerors gigantic, while their subjects and vassals are represented as only a fourth or fifth part of their size. — *Cuvier.*

Why is the carnivorous bull of Agatharcides a monster of invention?

Because nature has never joined cloven hoofs and horns, as in the bull, with teeth adapted for cutting and devouring animal food.

The mouth of this bull, says the fable, extending from ear to ear, devoured every other animal that came in its way. — *Cuvier.*

Why had the ancients their fables about the graves of giants?

Because they believed giants to have been buried wherever the bones of elephants were dug up.— *Cuvier.*

END OF THE QUADRUPEDS.

KNOWLEDGE FOR THE PEOPLE:

OR THE

PLAIN WHY AND BECAUSE.

PART IV.—ZOOLOGY.—BIRDS.

ZOOLOGY.

BIRDS.

GENERAL ECONOMY.

Why are birds said to constitute, as it were, an isolated class of beings?

Because they are distinguished, by certain characters, from all other animals: their classification does not pass into any other, and cannot, therefore, be consistently introduced into the supposed chain or gradation of natural bodies. With regard to form, all birds coincide in having two feet, two wings, a bill, (either partly or entirely horny,) and a body covered with feathers. — *Blumenbach.*

Birds are extremely important creatures in the economy of Nature in general; although their immediate utility to mankind is infinitely less than that of mammifera. They destroy innumerable insects; and the thoughtless extirpation of some birds, supposed to be noxious, as sparrows, crows, &c, in many districts, has generally given rise to an infinitely more prejudicial multiplication of vermin. Other birds destroy larger animals, as field-mice, snakes, frogs, lizards, or consume carrion. Many extirpate weeds. On the other hand, they assist the increase and propagation of animals as well as plants. For instance, it is known that wild-ducks, in their emigrations, carry impregnated spawn into remote ponds, &c, and thus stock them with fish.* Many birds swallow seeds, which are subsequently expelled whole,and thus extensively dispersed : as the doves of Banda, with the nutmeg. The excrement of sea-birds manures bare cliffs and coasts, so as to render them capable of producing useful plants. Many species of falcons may be taught for the chase, as well as the cormorant for taking fish. Many birds, together with their eggs, fat, &c, serve for food; the entire skins of sea-birds for the clothing of many Northern nations; the feathers for stuffing beds, for writing, for various and often costly ornaments; in which respect, also, they form an important article of trade among many savage people, particularly the islanders of the Pacific Ocean. — *Blumenbach.*

Why are birds usually classed according to the forms of their bills and feet?

Because those parts are connected with their mode of life, food, &c, and influence their total habit very materially. — *Blumenbach.*

Why have birds little power of suction?

Because of the narrowness and rigidity of their tongue; as may be seen when they drink, having to hold up their heads, and depend upon the weight of the water for transmitting it into the craw. — *Rennie.*

Why are birds said to be 'poised' in the air?

Because the centre of gravity of their bodies is always below the insertion of their wings, to prevent them falling on their backs, but near that point on which the body is,during flight,as it were,suspended.

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* Insects have also been known to stock ponds on hills with fish. The large water-beetle, which feeds upon the spawn of fish, occasionally, in the evening, climbs up the stems of rushes, &c, out of the water, so as to take wing: in these circumstances it has been caught, and, on being put into water, has been found to give out the spawn with which it had gorged itself previous to taking flight, both in a digested and undigested state; so that, on trial, it has been found to produce fish of various kinds. — *Jameson.*

The positions assumed by the head and feet are frequently calculated to accomplish these ends, and give to the wings every assistance in continuing the progressive motion. The tail also is of great use, in regulating the rise and fall of birds, and even their lateral movements. — *Fleming.*

Why do birds fly?

Because they have the largest bones of all animals, in proportion to their weight; and their bones are more hollow than those of animals that do not fly. Air-vessels also enable them to blow out the hollow parts of their bodies, when they wish to make their descent slower, rise more swiftly, or float in the air. The muscles that move the wings of birds downwards, in many instances, are a sixth part of the weight of the whole body; whereas, those of a man are not in proportion one-hundredth part so large.

Why does flying differ from leaping?

Because flying is the continued suspension, and progress of the whole body, in the air, by the action of the wings. In leaping, the body is equally suspended in the air, but the suspension is only momentary. In flying, on the contrary, the body remains in the air, and acquires a progressive motion by repeated strokes of the wings on the surrounding fluid. — *Fleming.*

In swimming on the surface of the water, the legs of birds are exclusively employed; but when motion is accomplished beneath the surface, the wings are then chiefly in exercise.

Why are birds covered with feathers?

Because, by this addition to the non-conducting appendices of the skin, birds are enabled to preserve the heat, generated in their bodies, from being readily transmitted to the surrounding air, and carried off by its motions and diminished temperature. — *Fleming.*

Why are the strongest feathers of birds in the pinions and tail?

Because the pinion-feathers may form, when the wing is expanded, as it were, broad fans, by which the bird is enabled to raise itself in the air and fly; whilst its tail feathers direct its course.—*Blumenbach.*

Why are some few birds unfit for flight?

Because they have scarcely any pinion feathers. —*Blumenbach.*

Why do birds moult?

Because they may be prepared for winter; this change being analogous to the casting of hair in quadrupeds. During summer, the feathers of birds are exposed to many accidents. Not a few spontaneously fall: some of them are torn off during their amorous quarrels; others are broken or damaged; whilst, in many species, they are pulled from their bodies to line their nests. Hence, their summer dress becomes thin and suitable. Previous to winter, however, and immediately after incubation and rearing of the young is finished, the old feathers are pushed off in succession by the new ones, and thus the greater part of the plumage of the bird is renewed. —*Fleming.*

Why do certain birds appear to change colour in passing from one place to another?

Because colour is the gift of light. Thus, the indigo-bird appears at one time of a rich sky-blue, at another of a vivid verdigris green. When the angle of incidence in the rays of light reflected from the plumage of the bird is acute, the colour is green, when obtuse, blue. The colour of the head being of a very deep blue, is not affected by any change of position.

Why does the plumage of many Northern birds change from a dark colour to a pure white, on the approach of winter?

Because such change increases the warmth of the birds; the white colour reflecting heat most readily, and suffering it to escape but slowly by radiation.

The completeness of this provision for the changes of the season, is beautifully illustrated by the deep colours of the summer dress of birds, being exchanged for the white colour of winter, with a rapidity and extent proportional to the changes of the seasons. During a mild autumn, the shifting of the dark for the light-coloured dress proceeds at a very slow pace; and when the winter also continues mild, the white dress is never fully assumed. In some species, as the black guillemot, the white winter dress is never acquired *in this climate*, although its ash-coloured plumage intimates a tendency to the change. In the climate of Greenland, on the other hand, the change is complete, and the plumage is of a snowy whiteness.* — *Fleming.*

Why is it erroneous to imagine, that Northern birds, by thus becoming white, are better enabled to escape their foes, from their resemblance to the colour of the snow?

Because, if their white dress concealed them from their enemies, these last, by being deprived of their ordinary food, would be in danger of starvation and death. Neither is this variation of colour confined to weak or defenceless animals. Beasts and birds of prey are likewise subject to the change. Hence, if it yielded protection to some, it would enable others to prey with greater certainty of success on their defenceless neighbours; and would not thus be consistent with the wisdom and benevolence of the Creator. The popular opinion on the subject must, therefore, be relinquished; especially as the change of colour, from dark to white, does not vary, however different the habits, or even stations, of the animals may be, in which it takes place. — *Fleming.*

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* Similar changes occur in Quadrupeds: — see Part II, p. 8, of the present work; and for the difference of dark and white clothing, generally, Part I, p. 59.

Why do birds change the form of their eyes?

Because, when flying in the air, and meeting with many obstacles, as branches and leaves of trees, birds require to have their eyes sometimes as flat as possible, for protection; but sometimes as round as possible, that they may see the small objects, (flies and other insects) which they are chasing through the air, and which they pursue with the most unerring certainty. This could only be accomplished by giving them a power of suddenly changing the form of their eyes. Accordingly, there is a set of hard scales placed on the outer coat of their eye, round the place where the light enters; and over these scales are drawn the muscles or fibres by which motion is communicated; so that, by acting with these muscles, the bird can press the scales, and squeeze the natural magnifier of the eye into a round shape, when it wishes to follow an insect through the air; and can relax the scales, in order to flatten the eye again, when it would see a distant object, or move safely through leaves and twigs. This power of altering the shape of the eye is possessed by birds of prey in a very remarkable degree. They can see the smallest objects close to them, and can yet discern larger bodies at vast distances, as a carcass stretched upon the plain, or a dying fish afloat on the water. A singular provision is made for keeping the surface of the bird's eye clean, for wiping the glass of the instrument, as it were, and also for protecting it, while rapidly flying through the air, and through thickets, without hindering the sight. Birds are, for these purposes, furnished with a third eye-lid, a fine membrane or skin, which is constantly moved very rapidly over the eyeball by two muscles placed in the back of the eye. One of the muscles ends in a loop, the other in a string which goes through the loop, and is fixed in the corner of the membrane, to pull it backward and forward.

Why have birds more varied motion in the neck than quadrupeds?

Because in birds the neck has a greater number of bones, and consequently of joints: the contrivance by which the spine of animals is rendered susceptible of varied motion, being by means of a strong chain of bones, (vertebræ) locked together by means of knobs and projections, to prevent dislocation, a chain which stretches from the head to the extremity of the tail. Except in the three toed sloth, indeed, the bones in the neck of quadrupeds and of man are uniformly seven in number; the short-necked mole having the same as the long-necked giraffe; in birds, the number is never less than nine, and varies from that to twenty-four. — *Rennie.*

Why do birds sing?

Because of the receptacles of air already mentioned; but particularly by the disposition of the larynx, which in birds is not, as in mammifera and amphibia, placed wholly at the upper end of the windpipe; but, as it were, separated into two parts, one placed at each extremity. Parrots, ravens, starlings, bulfinches, &c, have been taught to imitate the human voice, and to speak some words: singing birds also, in captivity, readily adopt the song of others, learn tunes, and can even be made to sing in company, so that it has been possible actually to give a little concert by several bulfinches. In general, however, the song of birds in the wild state, appears to be formed by practice and imitation. — *Blumenbach.*

Why cannot birds be so correctly said to sing as to whistle?

Because natural singing is an exclusive privilege of man. — *Blumenbach.*

Why do the notes of different species of birds vary?

Because, probably, of the structure of the organs of each species enabling them more easily to produce the notes of their own species, than those of any other, and from the notes of their own species being more agreeable to their ears. These conditions, joined to the facility of hearing the song of their own species, in consequence of frequenting the same places, determine the character of the acquired language of the feathered tribes. — *Fleming.*

Those who have paid attention to the singing of birds, know well that their voice, energy, and expression, differ as widely as in man; and, agreeably to this remark, Mr Wilson, the celebrated ornithologist, says he was so familiar with the notes of an individual wood-thrush, that he could recognise him among all his fellows the moment he entered the woods.

Why are birds equally dispersed in spring over the face of the country?

Because, during that amorous season, such a jealousy prevails between the male birds, that they can hardly bear to be seen together in the same hedge or field. Most of the singing and elation of spirits, of that time, seem to be the effect of rivalry and emulation. — *G. White.*[*]

Why is August the most mute month, the Spring, Summer, and Autumn through?

Because many birds which become silent about Midsummer, reassume their notes in September; as the thrush, blackbird, woodlark, willow-wren, &c. — *G. White.*

Why is it inferred that birds possess some notion of power, and of cause and effect?

Because of the various actions which they perform. Thus, for example, we have seen the hooded-crow in Zetland, when feeding on small shell-fish, able to break some of the tenderer kinds by means of its bill, aided, in some cases, by beating them against a stone; but, as some of the larger shells, such as the

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[*] White's Natural History of Selborne.

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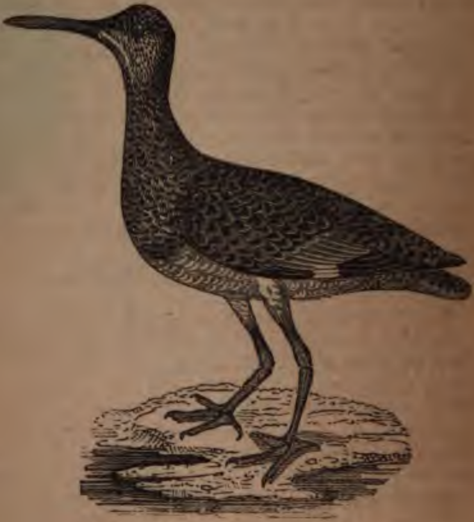

buckie and the wilk, cannot be broken by such means, it employs another method, by which, in consequence of applying foreign power, it accomplishes its object. Seizing the shell with its claws, it mounts up into the air, and then loosing its hold, causes the shell to fall among stones, (in preference to the sand, the water, or the soil on the ground) that it may be broken, and give easier access to the contained animal. Should the first attempt fail, a second or a third is tried, with this difference, that the crow rises higher in the air, in order to increase the power of the fall, and more effectually remove the barrier to the contained morsel. On such occasions, we have seen a stronger bird remain an apparently inattentive spectator of the process of breaking the shell, but coming to the spot with astonishing keenness when the efforts of its neighbour had been successful, in order to share in the spoil. Pennant mentions similar operations performed by crows on mussels. — *Fleming.*

Why do birds congregate in hard weather?

Because, as some kind of self-interest and self-defence is, no doubt, their motive, may it not arise from the helplessness of their state in such rigorous seasons; as men crowd together, when under great calamities, they know not why? Perhaps approximation may dispel some degree of cold; and a crowd may make each individual appear safer from the ravages of birds of prey and other dangers. – *G. White.*

Why do long-billed birds grow fat in moderate frosts?

Because of the gentle check which the cold throws upon insensible perspiration. The case is just the same with blackbirds, &c; and farmers and warreners observe, the first, that their hogs fat more kindly at such times; and the latter, that their rabbits are never in such good case as in a gentle frost. But when frosts are severe, and of long continuance, the case is soon altered; for then, a want of food soon overbalances the repletion occasioned by a checked perspiration. I have observed, moreover, that some human constitutions are more inclined to plumpness in winter than in summer. — *G. White.*

Why do we so often fail in rearing young birds?

Because of our ignorance of their requisite food. Every one who has made the attempt, well knows the various expedients he has resorted to, of boiled meats, bruised seeds, hard eggs, boiled rice, and twenty other substances that Nature never presents, in order to find a diet that will nourish them; but Mr Montagu's failure, in being able to raise the young of the curl-bunting, until he discovered that they required grasshoppers, is a sufficient instance of the manifest necessity there is for a peculiar food in one period of the life of birds. — *Knapp.**

Why have birds that live on seeds, a crop?

Because they swallow the grains unbroken, and the crop, abounding with glands, softens the seeds, which are thence gradually propelled into the stomach. The latter is in birds extremely muscular, and so powerful, that, according to the remarkable experiments of Reaumur and others, it is able to break nuts and olive kernels, and to wear the impressions on pieces of money as smooth as paper. — *Blumenbach.*

Why do voracious birds, when devouring their quarry, swallow bones and feathers, and all matters indiscriminately?

Because the bones, feathers, &c, assist to promote digestion.

Why do birds swallow little pebbles?

Because they assist in the division and subsequent digestion of their food. Physiologists have differed as to the object and use for which stones are thus swallowed. Many have even supposed that it proceeds from stupidity. According to my own investigation, it is an indispensable measure of assistance to digestion, by depriving the seeds swallowed of their vitality, with out which they would not yield to the digestive powers. – *Blumenbach.*

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* Journal of a Naturalist, 1829.

Why have most nocturnal birds large eyes and ears?

Because large eyes are necessary to collect every ray of light, and large concave ears to command the smallest degree of sound or noise.

Why are aquatic nocturnal birds, as cranes, wild ducks, &c, very noisy and loquacious?

Because their perpetual clamour prevents them from dispersing, and losing their companions.

Why are certain birds called 'waders?'

Because they usually frequent marshy grounds, and the margin of rivers, and wade among the mud or water. All of them are qualified for flying, by the size of their wings, and for running, by the length of their legs.

Why do some birds stand for a great length of time on one foot only, without much exertion?

Because of the length of the toes, and the manner in which they are disposed, joined to the disposition of the body with regard to its centre of gravity. Thus, in the *stork*, 'the surface of the femur, (or thigh-bone,) that articulates (or joins) with the tibia, (or the largest leg bone) has, in its middle, a depression which receives a projection of the latter bones. In bending the leg, this process is lifted out of the depression, and removed to its posterior edge. By this motion the ligaments are necessarily more stretched than during the extension of the leg, in which the process remains in its socket. These ligaments, therefore, preserve the leg extended in the manner of some springs, without receiving any assistance from the muscles.' — *Cuvier.*

Why have many genuine land birds the middle toe concerted by a web with the outer toe, as far as the first joint?

Because the sole of the foot is thus increased, and better adopted for standing or walking on the ground.

Why have some birds a claw cut like a saw or short-toothed comb?

Because they may comb out or rid their plumage of its vermin.

Why do some birds roll themselves in dust?

Because it may free them from annoyances, or prevent the bites of insects.—*Knapp.*

Why has it been asked whether Mahomet and his followers might not take one method of purification from these pulvatrices?

Because it is found from travellers of credit, that if a strict Mussulman is journeying in a sandy desert, where no water is to be found, at stated hours he strips off his clothes, and most scrupulously rubs his body over with sand or dust.—*G. White.*

Why are certain birds of a flock called sentinels?

Because they observe approaching danger, and speedily communicate it to the whole flock. In some cases these sentinels are deceived by false appearances. Dr Edmonstone, in his 'View of the Zetland Isles,' gives a very striking illustration of this neglect of the sentinel, in his remarks on the Shag. 'Great numbers of this species of the cormorant are sometimes taken during the night, while asleep on the rocks, and the mode of accomplishing it is very ingenious. Large flocks sit, during the night, on projecting rocks of easy access, but before they commit themselves to sleep, one or two of the number are appointed to watch. Until these sentinels are secured, it is impossible to make a successful impression on the whole body; and, to surprise them is therefore the first object. With this view, the leader of the expedition creeps cautiously and imperceptibly along the rock, until he gets within a short distance of the watch. He then dips a worsted glove in the sea, and gently throws water in the face of the guard. The unsuspecting bird, either disliking the impression, or fancying, from what he considers to be a disagreeable state of the weather, that all is quiet and safe, puts his head under his wing and soon falls asleep. His neck is then immediately broken, and the party despatch as many as they choose.'

Why is the new arrangement of birds called 'quinary?'

Because it proposes to arrange them in groups of *fives*, thus: *Raptores*, or birds of prey; *Insessores*, or perching birds; *Rasores*, or gallinaceous birds; *Grallatores*, or wading birds; *Natatores*, or web-footed birds. Each of these is divisible into *fives;* and again into *fives*. The details of the arrangement would occupy too much space in the present work; and for them the reader is referred to several papers on the subject by Mr Vigors, the ingenious secretary of the Zoological Society, who thinks the proposed arrangement to be strictly in accordance with the natural varieties of birds. It may be observed here, as a curious fact, that 'by far the greater number of the pie and sparrow tribe in this country, and perhaps elsewhere, generally lay *five* eggs; the rook, the crow, the hedge-sparrow, goldfinch, blackbird, thrush, &c. The advocates of the *quinary* arrangement will doubtless advance this in corroboration of their system.' *

Why are some birds called monogamous?

Because they pair, (from *monogamia*, one marriage.)

Why are other birds called polygamous?

Because they never, unless compelled, confine themselves to individual association. — (From *polygamia*, many marriages.)

The whole number of birds enumerated by Linnæus, specifically, is only 960; while those described by Dr Latham, in his recently published work, amount to about 5,000.

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* Jennings' Ornithologia.

Why do birds exceed quadrupeds in the quantity of their respiration?

Because they have not only a double circulation and an aërial respiration, but they respire also through other cavities besides the lungs, the air penetrating through the whole body, and bathing the branches of the aorta, or great artery of the body, as well as those of the pulmonary artery. — *Cuvier.*

Why is parental affection more obvious in birds than in other animals?

Because most of their young remain in the nests, wherefore the parents have no cessation of labour from early morning to the close of eve, till the brood can provide for themselves. The young of beasts, on the other hand, sleep much; some are hidden in lairs and thickets nearly all the day, others take food only at intervals or stated periods, the parent ruminating, feeding, or reposing, too. — *Knapp.*

Why are birds called oviparous?

Because they produce their young from the egg, (*ovum* an egg, and *pario* to bring forth.)

Why is there attached to the upper mandible of all young birds about to be hatched, a horny appendage?

Because the birds may more effectually perforate the shell, and thus contribute to their own liberation. This sharp prominence or appendage, becomes opposed to the shell at various points, in a line extending throughout its whole circumference, about one-third below the larger end of the egg; and a series of perforations, more or less numerous, is thus effected by the increasing strength of the bird, weakening the shell in a direction opposed to the muscular power of the little captive, which is thus ultimately enabled, by its own efforts, to break the walls of its prison. In the common fowl, this horny appendage falls off in a day or two after the chick is hatched; in the pigeon, it sometimes remains on the beak ten or twelve days: this arises, doubtless, fro the young pigeons being fed by the parent bird some time after being hatched; and thus there is no occasion for the young using its beak to pick up food.

This singular fact was first noticed by Mr Yarrel, a clever contributor to the *Zoological Journal.*

Why are the eggs of birds enclosed in a shell?

Because the shell or calcareous coating, which consists of carbonate and phosphate of lime, is to unite with the white of the egg, and form, during incubation, the feathers and bone of the future young ones; but, as a large portion of this covering remains after the young are produced, its other object is to guard from injury the parts within. — *Knapp.*

Why is it puzzling to identify the eggs of birds when detached from their nests?

Because the eggs vary so much, and the colourings and markings differ greatly in the same species, and even nest.

Why is it concluded that the colouring matter on the shells of eggs does not contribute to the various hues of the plumage?

Because, though the calcareous matter is partly taken up during incubation, the markings upon the eggs remain little injured, even to the last, and are almost as strongly defined, as when the eggs are first laid. Again, eggs entirely white will produce birds with a variety of plumage. — *Knapp.*

Why is artificial incubation but seldom successful?

Because of the great difficulties in graduating the heat properly.

For a Table of the respective periods, see *Brande's Journal,* 1829.

Why do stale eggs float upon water?

Because, by keeping, air is substituted for a portion of the water of the egg, which escapes. —*Prout,* *Why has the breast-bone of all birds which fly, a long ridge or keel?*

Because muscles are attached to it, to facilitate their flight.

Why has it been playfully said that birds pair on Valentine's Day?

Because, however puerile the notion itself may be, it is certain that about the above period, or sooner or later in the spring, many birds cease their gregarious association, and meet only in pairs for incubation and rearing their young.

Why is it thought that the songs of birds are the effect of pleasurable sensations?

Because most birds sing only during fair weather. Some of them will occasionally sing even during wet weather: many of the thrush tribe do so. Mr Bowles illustrates this in the following simile:—

> As some lone bird at day's departing hour,
> Sings in the sunbeam of the transient shower,
> Forgetful though its wings be wet the while.

Why does one sex only of birds sing?

Because as Buffon supposed, of cheering his mate during the period of incubation; but this idea, gallant as it is, has but slight foundation in probability: and, after all, perhaps, we must conclude, that, listened to, admired, and pleasing as the voice of many birds are, either for their intrinsic melody, or from association, we are uncertain what they express, or the object of their song. The singing of most birds seems entirely a spontaneous effusion, produced by no exertion, or occasioning no lassitude of muscle, or relaxation of the parts of action. In certain seasons and weather, the nightingale sings all day and most part of the night; and we never observe that the powers of song are weaker, or that the notes become harsh and untuneable, after these hours of practice. The cuckoo is probably the only bird that seems to suffer from the use of the organs of voice.

Why do birds sing comparatively louder than man?

Because the strength of the larynx, and of the muscles of the throat in birds is infinitely greater than in the human race. The loudest shout of the peasant is but a feeble cry, compared with that of the golden-eyed duck, the wild-goose, or even the woodlark.

Birds of one species sing in general very like each other, with different degrees of execution. In the thrush, however, it is remarkable, that there seem to be no regular notes; each individual piping a voluntary of his own. — *Knapp.*

Why do most of our little songsters, when captured as old birds, become in confinement sullen and dispirited?

Because want of exercise and of particular kinds of food, and their changes, alter the quality of their fluids: they become fattened, and indisposed to action, by repletion; fits and ailments ensue, and they mope and die. — *Knapp.*

Why is it reasonable to conclude that the notes used by birds, and the voices of animals, are the same as uttered by the earliest progenitors?

Because, could we find a people, from Japan to the Pole, whose progress in mind has been stationary, without increase of idea, from national prejudice or impossibility of communication with others, we should probably find little or no alteration in the original language of that people: so, by analogy of reasoning, the animal having no idea to prompt, no new want to express, no converse with others — for a note caught and uttered, is merely like a boy mocking a cuckoo; so *no new language is acquired.* This fact is also corroborated by various little scraps of intelligence scattered through the sacred and ancient writings. With civilized man all is progressive; with animals, where there is no mind, all is stationary. -- *Knapp.*

Why have birds that feed on grain and seeds a gizzard?

Because the gizzard, being covered with very strong muscles, by its action, comminutes the food. Other birds, that are carnivorous or piscivorous, have a stomach more resembling that of carnivorous quadrupeds; the digestion of such birds being more accelerated by the gastric juice than by the action of the stomach itself.

Why are hedge fruits, as hips and haws, sometimes refused by birds?

Because the summer has been ungenial, the berries have not ripened well, but have been nipped by frost, and hang on the sprays, dark in colour, small, and juiceless in substance.

Why is it best to feed very small birds with meat?

Because animal food most readily assimilates with the fluids of their bodies, with the least efforts of the digestive powers.

Why do many birds sleep on trees?

Because the motion of the branches produced by the wind, increases their disposition for sleep. This may be exemplified in the common fowl; for, placing its bill under the wing, even in broad daylight, and swaying it to and fro in the hand for a very short time, will produce sleep; a beautiful proof o the adaptation of birds to the function.—*Jenning*

Why do not birds fall down in sleeping on thei perch?

Because such is the structure of their feet an legs, that the greater the weight upon the muscles the more firmly the claws grasp whatever they la hold of.

Why does the signal of danger among birds seem t be of universal comprehension?

Because, the instant that it is uttered, we hea the whole flock, though composed of various spe cies, repeat a separate moan, and away they al scuttle into the bushes for safety.—*Knapp.*

Why is the eagle and some other birds enabled to bear the strongest light of the sun?

Because it has a membrane (*see page* 8,) with which the bird can, at will, cover the pupil of the eye while the eyelids remain open.

Why are aqueous birds better supplied with food than those on land?

Because fish, the food of the former, are probably but little influenced by season; while our poor land birds find theirs to be nearly annihilated in some cases.

Why is the plumage of aquatic birds kept dry?

Because the small feathers next the bird fall over each other like the tiles of a roof, and thus throw off the water.

Paley tells us that the '*laminæ* or layers of the feathers of birds are kept together by teeth that hook into each other, "as a latch enters into the catch, and fastens a door."'

Why have birds two united glands on the rump?

Because these glands secrete a mucous oil, which may be pressed out by the bill of the bird, to anoint the feathers, and replace them when they are discomposed. Aquatic birds have their feathers dressed with this oil from first leaving the shell, but the feathers of other birds are pervious to every shower. Thomson thus alludes to this oleous unction:—

> 'The plumy people streak their wings with oil,
> To throw the lucid moisture off.'

Why have birds the pip?

Because the oleous glands just described, become diseased and swollen. It is generally remedied by a single puncture, by which the collected fluid may be discharged.—*Jennings' Ornithologia.*

Why do dab-chicks, moor-hens, and coots, fly erect, with their legs hanging down, and hardly make any despatch?

Because their wings are placed too forward out of the true centre of gravity; as the legs of auks and divers are situated too backward. — *G. White.*

Why do penguins, and birds of the same group walk nearly upright?

Because the legs are placed farther back than in other birds.

Why is the ancient custom of giving parish rewards for the destruction of small birds as vermin, still continued?

Because it may have been requisite in former times, to keep under or reduce the numbers of many predaceous animals, which, in a thickly wooded country, with an inferior population, might have been productive of injury; and we even find parliamentary statutes enacted for this purpose: but now, however, our loss by such means has become a very petty grievance; our gamekeepers do their part in removing pests of this nature, and the plough and the axe leave but little harbour for the few that escape; and thus we war on the smaller creatures of creation, and call them vermin. An item passed in one of our churchwardens' accounts, was, 'for seventeen dozen of tomtits' heads!' In what evil hour, or for what crime, this poor little bird can have incurred the anathema of a parish, it is difficult to conjecture. The price set upon its head is four-pence per dozen, probably the ancient payment when the groat was a coin. — *Knapp.*

MIGRATION.

Why has the existence of migration been denied?

Because of the surprise, how migrating birds could support themselves so long on wing, as to accomplish their journeys, and at the same time live without food during their voyage. These difficulties, however, vanish altogether if we attend to the rapidity of the flight of birds. Hawks and many other birds probably fly at the rate of 150 miles an

an eider-duck at 90 miles an hour: Sir George y computes the common crow to fly at nearly es an hour ; and Spallanzani found that of the w about 92 miles, while he conjectures the ty of the swift to be nearly three times great- falcon which belonged to Henry IV of France, d from Fontainbleau, and in twenty-four hours ards was found at Malta, a distance computed o less than 1530 miles ; a velocity nearly equal miles an hour, supposing the falcon to have nceasingly on the wing. But, as such birds fly by night, and allowing the day to be at the t, his flight was perhaps equal to 75 miles an
If we even restrict the migratory flight of o 50 miles an hour, how easily can they per- heir most extensive migrations ! Fair winds erhaps aid them at the rate of 30 or 40 miles ur ; nay with three times greater rapidity. — g.

migrations of the feathered tribes have been ject of popular observation, since the days of ophet Jeremiah : 'For the stork in the hea- noweth her appointed times ; and the turtle e crane, and the swallow, observe the time ir coming.' (*ch.* viii, *v.* 7.)

are certain migrating birds called Summer of Passage?

ause they arrive in this country in the spring, epart from it in the winter.

are other migrating birds called Winter Birds ssage?

ause they arrive in autumn, and depart in .

may the autumnal shifting of birds, with pro- be termed their Equatorial Migration?

ause all those species in which it is observed, from the Pole towards the Equator, in search of nperature congenial to their constitutions, and which the winter of the district of their summer residence could not afford. — *Fleming.*

Why may the vernal shifting, with equal propriety be termed the Polar Migration?

Because all the species recede with the increasing temperature of the high latitudes of the Equator, and approach towards the Pole. — *Fleming.*

Why do certain birds migrate to mild countries on the approach of winter?

Because they are unable sufficiently to provide against the vicissitudes of the seasons, by varying the quantity and colour of their dress; but are thus protected by shifting their quarters, so as to live throughout the whole year in a temperature congenial to their constitutions. — *Fleming.*

Why are birds sometimes found at sea, in a very exhausted state, on the rigging of ships?

Because, in their annual migrations, birds are occasionally overtaken by storms of contrary wind, and carried far from their usual course.

Mr White, however, in his *Natural History of Selborne*, says, 'It does not appear to me that much stress may be laid on the difficulty and hazard that birds must run in their migrations, by reason of vast oceans, cross-winds, &c; because, if we reflect, a bird may travel from England to the Equator without launching out or exposing itself to boundless seas — and that by crossing the water at Dover, and again at Gibraltar. And I with the more confidence advance this obvious remark, because my brother has always found that some of his birds, particularly the swallow kind, are very sparing of their pains in crossing the Mediterranean; for, when arrived at Gibraltar, they do not —

Ranged in figure, wedge their way,
——and set forth
Their airy caravan high over seas

Flying, and over lands with mutual wing
Easing their flight; — *Milton.*

but scout and hurry along in little detached parties of six or seven in a company; and sweeping low, just over the surface of the land and water, direct their course to the opposite continent, at the narrowest passage they can find. They usually slope across the bay to the south west, and so pass over opposite to Tangier, which, it seems, is the narrowest space.'

Why do the periods of the arrival and departure of migrating birds vary in different years?

Because they depend entirely on the changes of the seasons. Thus, the meanest rustic, in regard to the summer birds of passage, is aware, that cold weather prevents the arrival of these messengers of spring; and that the early arrival of our winter birds of passage, indicates a proportionally early winter.

Why is the arrival of these summer birds to be partly prognosticated by the leafing or flowering of particular trees or plants?

Because the same circumstances of temperature which retard the birds, also check the progress of vegetation. As the state of vegetation depends on the temperature of the season, and the life of the insects, (the food of birds) on the state of vegetation, we may safely conclude, that the movements of the phytivorous (vegetable-eating) and insectivorous birds must be dependent on the condition of plants. — *Fleming.*

Why is torpidity also called hybernation?

Because it is evidently designed to afford animals protection against the cold of winter.

Actual torpidity in birds is very rare; yet the few instances on record establish the fact, while they point to the numerous resources of Nature in extreme cases, to preserve existence.

Why were seven of the migratory birds formerly called the Seven Sleepers?

Because it was then supposed that many birds, which, it is now known, unquestionably migrate, retired to some secure retreat, and there remained dormant during the winter. — *Jennings.*

Why does the early arrival of wild geese and ducks, and other migrating birds from the north, in the winter, portend that a severe season is approaching?

Because the *early* appearance of these birds is most likely caused by severe frost having already set in, at their usual summer residence. — *Jennings.*

Why do the bird-catchers in the neighbourhood of London, procure males only on the first arrival of this bird?

Because the males of many species of migrating birds appear to perform their migrations a few days before the females; and this is remarkably the case with the nightingale. The females do not make their appearance for a week or ten days after the males. — *Fleming.*

BRITISH AND EUROPEAN BIRDS.

EAGLES.

Why has so much confusion arisen in the names of several of the eagle species?

Because of the great changes in the colour of the feathers of several of the genus, during their process to maturity.

THE HAWK.

Why was the practice of hawking discontinued?

Because of the introduction of the use of gunpowder.

Aristotle, Pliny, and many other ancient writers, speak of the method of catching birds by means of hawking; but it is said, that falconry was practised with far more spirit and universality among the ancient Britons, than in any other nation.

Why is the falcon so honourable an emblem of heraldry?

Because, in former times, and in many countries, the custom of carrying a falcon about was esteemed a mark of a man of rank: many persons of distinction were painted with a hawk on the hand.

Why is the village of Falconsward, in Holland, so called?

Because a race of falconers was there born and bred, whence supplies have been drawn for the service of all Europe; but as there has been no sufficient inducement for the young men to follow the employment of their forefathers, numbers are dead, or worn out; and there only remains John Pells, now in the service of John Dawson Downes, Esq. of Old Ginton Hill, Suffolk. — *Sir John Sebright*, 1827.

Why is the Icelander highly esteemed by falconers?

Because it is the largest hawk that is known, and is of great power and the most tractable disposition. The gyr-falcon is less than the Icelander, but much larger than the slight falcon. These powerful birds are flown at herons and hares, and are the only hawks that are fully a match for the fork-tailed kite. The merlin and hobby are both small hawks, and fit only for small birds, as the blackbird, &c. The sparrow-hawk may be also trained to hunt; his flight is rapid for a short distance, he kills partridges well in the early season, and is the best of all for land-rails. — *Sir John Sebright.*

OWLS.

Why was the owl the emblem of wisdom among the Greeks?

Because its skull is elevated: it is, however, without a proportionate volume of brain.

Linnæus, with many other naturalists and antiquaries, have supposed that the horned owl was the bird of Minerva. Blumenbach has, however, shown, from the ancient works of Grecian art, that it was not this, but rather some smooth-headed species, probably, the *passerina*, or little owl.

Why are barn-owls more numerous than brown-owls?

Because the young of the brown-owl are not so easily raised, as they want a constant supply of fresh mice; whereas, the young of the barn-owl will eat indiscriminately all that is brought: snails, rats, kittens, puppies, and any kind of carrion or offal.—*G. White.*

Why is the owl thought to be of the same sympathy or kindred likings as those of the cat?

Because a young owl has been found to feed well and thrive upon fish. Cats too, it is well known, like fish, and Dr Darwin relates an anecdote of a cat taking fish in a mill-pool. Both the cat and the owl too feed upon mice. The sight of owls also, similar to that of cats, appears to serve them best in the dark. *(See page 29.)*

Why are white owls vulgarly called screech-owls?

Because of their horrible screaming as they fly along. This species of owl, some people superstitiously believe, attends the windows of dying persons.

Mr White, in one of his delightful Letters to Mr Pennant, says, 'My musical friend, at whose house, (Fyfeld, near Andover) I am now visiting, has tried all the owls that are his near neighbours, with a pitch-pipe set at concert pitch, and finds they all hoot in B flat. He will examine the nightingales next spring.' From what follows this note, it, however, appears, that 'neither owls nor cuckoos keep to one note'

Why is the plumage of the wings of owls remarkably soft and pliant?

Because they should not make much resistance or rushing, that they may steal through the air unheard upon a nimble and watchful quarry. — *G. White.*

Why do owls, in flying, stretch out their legs behind them?

Because they may balance their large heavy heads; for, as most nocturnal birds have large eyes and ears, they must have large heads to contain them. — *G. White.*

Major Head thus describes the *biscacho*, or coquimbo, a curious species of owl, found all over the Pampas of South America.

'Like rabbits, they live in holes, which are in groups in every direction, and which makes galloping over these plains very dangerous. These animals are never seen in the day; but, as soon as the lower limb of the sun reaches the horizon, they are seen issuing from their holes in all directions, which are scattered in groups, like little villages, all over the Pampas. The biscachos, when full grown, are nearly as big as badgers, but their head resembles a rabbit's, except that they have large bushy whiskers. In the evening they sit outside their holes, and they all appear to be moralising. They are the most serious looking animals I ever saw; and even the young ones are gray-headed, wear mustachios, and look thoughtful and grave. In the day-time, their holes are guarded by two little owls which are never an instant away from their posts. As one gallops by these owls, they always stand looking at the stranger, and then at each other, moving their old-fashioned heads in a manner which is quite ridiculous, until one rushes by them, when fear gets the better of their dignified looks, and they both run into the biscacho's hole.'

Why has the night-jar the middle claw cut into serratures, like a saw or a short-toothed comb?

Because it may rid its plumage of vermin or dirt, by combing.

Wilson, the distinguished American ornithologist, also tells us that the inner edge of the middle claw of the whip-poor-will* is pectinated, and from the circumstance of its being found with small portions of down adhering to the teeth, is probably employed as a comb, to rid the plumage of its head of vermin, this being the principal and almost the only part so infested in all birds. Of another species, called chuckwill's widow, he says, 'their mouths are capable of prodigious expansion, to seize with more certainty, and furnished with long hairs or bristles, serving as palisades to secure what comes between them. Reposing much during the heats of the day, they are much infested with vermin, particularly about the head, and are provided with a comb on the inner edge of the middle claw, with which they are often employed in ridding themselves of these pests, at least when in a state of captivity.'

Why is the fern owl, or night-jar, popularly called the goatsucker?

Because of an erroneous notion that it sucks goats; a thing, which the structure of its bill renders impossible.

THE SHRIKE,

Why is the shrike or butcher-bird, also called by Linnæus, a sentinel?

Because it seldom conceals itself in a bush, but sits perched on some upper spray, or in an open situation, heedful of danger, or watching for its prey.

THE WOODPECKER,

Why do woodpeckers tap with their bill the trees on which they sit?

Because they may disturb the insects concealed within, so as to seize them when they appear,

Why is the white-billed woodpecker called the carpenter's bird?

---

* See Foreign Birds.

Because of the great quantity of chips which it
nakes.

This bird, and the order to which it belongs, are
ermed *peckers*, and have a very remarkable struc-
ure of the tongue, consisting of two long cartila-
es, which are placed immediately under the skin,
unning from behind forwards over the skull, and
erminating at the forehead near the root of the bill.
hese cartilages, are like springs, by means of which
he bird can more readily protrude its worm-shap-
d tongue, and transfix insects with its horny point.
— *Blumenbach.*

THE KINGFISHER.

Why is the term halcyon used figuratively for quiet?

Because the halcyon or kingfisher was feigned by
he poets to breed in the sea, and that there was
lways a calm during her incubation. —

As firm as the rock, and as calm as the flood,
Where the peace-loving halcyon deposits her brood.
Cowper.

THE DOTTREL.

*Why is the dottrel every year becoming more and
nore scarce in the vicinity of Keswick?*

Because some parts of its plumage are in very
reat request by the manufacturers of artificial flies
or fishing, which accounts for their being pursued
nd killed in such numbers.

ROOKS.

Why is the rook one of the earliest birds?

Because its principal food is worms, which feed
nd crawl upon the humid surface of the ground in
he dusk, and retire before the light of day; and,
oosting higher than other birds, the first rays of
he sun, as they peep from the horizon, become
isible to it. — *Knapp.*

*Why do rooks sometimes appear to be falling to the
round?*

Because they are scratching themselves with one foot, and thus lose their centre of gravity. — *G. White.*

Why is a flock of rooks so frequently attended by a train of starlings?

Because rooks have a more discerning scent than starlings, and can lead them to spots more productive of food. Anatomists say that rooks, by reason of two large nerves which run down between the eyes into the upper mandible, have a more delicate feeling than other round-billed birds, and can grope for their meat when out of sight. Perhaps, then, their associates attend them from interest, as greyhounds wait on the motions of their finders, and as lions are said to do on the yelpings of jackals. — *G. White.*

Why are rooks' eggs prized?

Because, though bearing little resemblance to those of the plover, they are, in some places, not uncommonly taken, and sold as plover's eggs in the London market; and, probably, the habitual eater of them can alone distinguish a sensible difference.

Why are rooks less abundant than formerly?

Because their haunts have been disturbed by the felling of trees, in consequence of the increased value of timber, and the changes in our manners and ideas. Rooks love to build near the habitation of man; but their delight, the long avenue, is no longer the fashion; and the poor birds have been dispersed to settle on single distant trees, or in the copse, and are captured and persecuted. In many counties, very few rookeries remain, where once they were considered as a necessary appendage, and regularly pointed out the abbey, the hall, the court-house, and the grange. — *Knapp.*

The following anecdote of the rook is related in the *Zoological Journal*, and merits introduction here, for the excellent lesson it affords to man. 'A gentleman occupied a farm in Essex, where he had not long resided, before numerous rooks built their nests on the trees surrounding his premises; the rookery was much prized; the farmer, however, being induced to hire a larger farm about three quarters of a mile distant, he left the farm and the rookery; but, to his great surprise and pleasure, the whole rookery deserted their former habitation, and came to the new one of their old master. It ought to be added, that this gentleman was strongly attached to all animals whatsoever, and, of course, used them kindly.'

Why is a hot summer fatal to rooks?

Because their food, grubs, insects, and worms, is then mostly hidden in the earth beyond their reach. At this time, were it not for its breakfast of dew-worms, which it catches in the gray of the morning, as it is appointed the earliest of risers, it would commonly be famished. In the hot summer of 1825, many of the young brood of the season perished rom want; the mornings were without dew, and onsequently few or no worms were to be obtained. —*Knapp.*

RAVENS.

Why is the raven most common on the shores of harours, or near great rivers?

Because animal substances, its food, are more frequently to be met with there, than in inland places. n Greenland and Iceland, where putrescent fishy ubstances abound, they appear to be almost domesticated.

Why is the raven one of the chosen birds of supertition?

Because of its supposed longevity, its frequent mention and agency in holy writ; the obscure knowledge we possess of its powers and motives; and the gravity of its deportment, like an 'all-knowng bird,' which has acquired for it, from very remote periods, the veneration of mankind. The changes in our manners and ideas, in respect to many things, have certainly deprived them of much of this reverence; yet the almost supernatural information which they obtain of the decease, or approaching dissolution, of an animal, claims still some admiration for them. This supposed faculty of 'smelling death' formerly rendered their presence, or even their voice, ominous to all, as

> The hateful messenger of heavy things,
> Of death and dolour telling;

and their unusual harsh croak, still, when illness is in the house, with some timid and affectionate persons, brings old fancies to remembrance, savouring of terror and alarm. — *Knapp.*

The poets have highly embellished this superstition: Drayton says: —

> The greedy raven, that doth call for death.

and quotes Pliny for his authority. Shakspeare —

> The raven himself is hoarse,
> That croaks the fatal entrance of Duncan
> Under my battlements. *Macbeth.*

Sir Walter Scott: —

> All nations have their omens drear,
> Their legions of wild woe and fear.
> To Cambria look — the peasant see,
> Bethink him of Glendowerdy,
> And shun 'the Spirit's Blasted Tree.' — *Marmion* —

in the notes to the sixth canto of which are the following lines in a poem by the Rev. George Warrington, entitled '*the Spirit's Blasted Tree.*'

> Three ravens gave the note of death
> As through mid air they wing'd their way;
> Then o'er his head in rapid flight,
> They croak — they scent their destined prey.
>
> Ill omen'd bird! as legends say,
> Who hast the wondrous power to know,
> While health fills high the throbbing veins,
> The fated hour when blood must flow!

Again, Sir Walter Scott: —

> Seems he not Malice, like a ghost
> That hovers o'er a slaughter'd host?
> Or *Raven* on the blasted oak
> That, watching while the deer is broke,
> His morsel claims with sullen croak.
> *Lady of the Lake.*

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ASTOR, LENOX AND
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THE MAGPIE.

Why does the magpie cover its nest with thorns?

Because its eggs may thus be protected from irds; a danger which it seems to understand, by ts feeding on the eggs of others.

THE JAY.

Why was the jay formerly persecuted through all its etreats?

Because the beautiful blue-barred feathers, that form the greater coverts of the wings, distinguish it from every other bird; wherefore they were much in request in the days when feather-work was in fashion with our fair country-women.

THE CUCKOO.

Why has the cuckoo a broad, hollow back?

Because, soon after the young cuckoo is hatched by the hedge-sparrow, the eggs, or the young ones, whichever should happen to be in the nest, are turned out of it by the cuckoo, and by it alone; to effect which, the cuckoo is conjectured to have this peculiar conformation of the back.

[We quote this observation from a paper by Dr Jenner, in the *Philosophical Transactions* for 1788; premising the anomaly of the cuckoo laying its eggs in other birds' nests, to be familiar to the reader. We have not space to pursue the subject further, neither will the details of a controversy be looked for in the present work. Mr Jennings has sensibly observed — 'The truth seems to be, notwithstanding all that has been observed and published concerning the cuckoo, that its natural history is still involved in considerable obscurity.']

Till lately, it was not known that any bird laid its eggs in the nests of other birds, besides the cuckoo; it is now, however, well ascertained, that the American cowpen, or cow-bunting, lays its eggs in other birds' nests, and takes no care whatever of its offspring. — *Jennings.*

Why are cuckoos supposed to migrate in success

Because the cuckoo, seldom seen in company his mate, even during the breeding season, is, t appearance, equally solitary at the period of mi tion.

Why may the cuckoo be said to have done much musical science?

Because from that bird has been derived *minor scale*, whose origin has puzzled so m the cuckoo's couplet being the *minor third* downwards.—*Mag. Nat. Hist.*

THE MISSEL-BIRD.

Why is the missel-bird, in Hampshire and Su called the storm-cock.

Because it sings early in the spring, in blow showery weather.— *G. White.*

THE LARK.

Why do the songs of the sky-lark and wood-lark d

Because the song of the sky-lark is very sw full of harmony, extremely cheerful, and known admired by all; but the voice of the woodla local, not so generally heard, from its softness almost be listened for to be distinguished, and not any pretensions to the hilarity of the form

The ill-fated Shelley has some exquisite lines sky-lark:—

> Hail to thee, blithe spirit;
>   Bird thou never wert,
> That from heaven or near it,
>   Pourest thy full heart
> In profuse strains of unpremeditated art.
> Higher still and higher
>   From the cloud thou springest,
> Like a cloud of fire;
>   The deep blue thou wingest,
> And singing still dost soar and soaring ever singest.
>
> * * * * * * *
>
> Teach me half the gladness
>   That thy brain must know,
> Such harmonious madness
>   From my lips would flow,
> The world should listen then, as I am listening now.[*]

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[*] See the 'Beauties of Shelley,' 18mo, 1830.

SWALLOWS.

Why is the submersion of swallows during winter, in lakes and rivers, an improbable occurrence?

Because swallows are much lighter than water, and could not sink in clusters, as they are represented to do. If their feathers are previously wetted, to destroy their buoyant power, in what manner can they resist the decomposing effect of six months' maceration in water, and appear in spring as fresh and glossy as those of other birds? Swallows do not moult while they remain with us in an active state; so that, if they submerge, they either do not moult at all, or perform the process under water. In the case of other torpid animals, some vital actions are performed, and a portion of oxygen is consumed; but in the submersed swallows, respiration, and consequently, circulation, must cease. Other torpid animals, too, in retiring to their winter slumbers, consult safety: while the swallow, in sinking under the water, rushes to the place where the otter and the pike commit their depredations. It is now ascertained that migration is in ordinary cases practised by the swallow; yet their submersion has been believed by many naturalists; — such as, Klein, Linnæus, and others. — *Fleming.*

Why are swallows rarely seen in London, although they are numerous in the suburbs?

Because flies are not so plentiful in London as in the open country, and most of the chimneys have conical tops to them; which, if they do not preclude, are certainly no inducement for their building in such places; the top of a chimney being its favourite site for its nest. — *Jennings.*

Why are 'chimney swallows' improperly so called?

Because they by no means build altogether in chimneys, but often within barns and out-houses, against the rafters. In Sweden, the swallow builds in barns, and is called *lada swala,* the barn swallow. — *G. White.*

Why may fine weather be expected or continued, when swallows fly high, and rain when the birds fly low and close to the ground?

Because swallows pursue the flies and gnats, and flies and gnats usually delight in warm strata of air; and as warm air is lighter, and usually moister, than cold air, when the warm strata of our air are high, there is less chance of moisture being thrown down from them by the mixture with cold air; but when the warm and moist air is close to the surface, it is almost certain that, as the cold air flows down into it, a deposition of water (or rain) will take place. — *Sir H. Davy.*

Why, after swallows have disappeared for some weeks, are a few occasionally seen, and that only for one day?

Because, probably, they withdraw, and slumber in some hiding-place during the interval; for it cannot be supposed that they had migrated, and so returned again for one day: more probably, they are awakened from sleep, and, like the bats, are come forth to collect a little food. — *G. White.*

Why is a certain species of swallow called 'esculenta,' or edible?

Because its nests are eaten as great delicacies. They are found in the Indian Archipelago, and form an article of trade to the China market, where those of the first quality fetch their weight in gold! They are used to make soup, to which are ascribed powerfully restorative qualities. The substance of which these nests consist, resembles isinglass, and is disposed in irregular, transverse threads, with a few feathers interposed. Neither the analytical experiments of Dobereiner, nor those of Brande demonstrate it to be of animal origin. The relatively small portion of ammonia, indeed, which it yields, and its facility of incineration, rather lead to the conclusion that it is a vegetable gum. It was once supposed to be procured from the scum of the sea. Those individuals, however, residing fifty miles from the sea, employ the same materials as those which dwell on the shore. The other species in those districts likewise employ a portion of the same substance in the fabrication of their nests. — *Fleming.*

THE STARLING.

Why do starlings probably migrate to this country alone?

Because few other birds could travel so long, and continue such a rapid motion.

From some rude observations, it appears probable, that a pair of starlings in conjunction do not travel less than fifty miles in the day, visiting and feeding their young about one hundred and forty times, which, consisting of five in number, and admitting only one to be fed each time, every bird must receive in this period eight and twenty portions of food or water.

THE CROSS-BILL.

Why is the cross-bill so called?

Because the mandibles of the beak do not lie upon each other, with their lateral edges in opposition, as in other birds, but *cross*, or curve to the right and left, and always in opposite directions to each other. In some specimens, the upper mandibles curve downwards and to the left, the under portion turned upwards, and to the right. — *Mr Yarrel, in the Zoological Journal.*

Why is the cross-bill so destructive in orchards?

Because it feeds upon the seeds of the apple, by cutting the fruit asunder with its well-constructed mandibles, in order to obtain the kernels.

THE BULFINCH.

Why is a snowy, severe winter, peculiarly destructive to the bulfinch?

Because it feeds in this season upon the 'hips' of the dog-rose, which are scarce in hard weather; when they are gone, it seems to pine for food, and is starved, or perhaps frozen, on its roost, as few are observed to survive a long inclement winter.

Why do bulfinches often become wholly black?

Because they are fed on hemp-seed. Such influence has food on the colour of animals! The pied and mottled colours of domesticated animals, are supposed to be owing to high, various, and unusual food. — *White.*

Why do bulfinches pipe?

Because they are taken, when very young, from their nests, and taught by a barrel-organ. Their tuition is a task of strict discipline, and is commenced when they first begin to whistle, or at the age of two months. They are taught in classes of about six in number; they are naturally great mimics; the barrel-organ is of a single diapason, and only plays one air. The birds, before they make their first essay, are comparatively starved, are placed in a dark room round the organ, and the air is played slowly to them. The moment they mimic the organ, the light is admitted into the room, and a little food is given to them; this is repeated so often, and works upon them so mechanically, that the organ is to them a sure presage of their being fed. During this time, they are fed and attended by one person only. After a month's drilling, they are handed over to boys, who are employed to play to them. Each boy takes a bird; and during these exercises, or rather rehearsals, they are occasionally visited, and always fed, by their old teacher; who, by various motions of the head and mouth, checks or encourages them in their piping, according to their merits: for instance, when they repeat a stave too often, he scowls and blows upon them; and when they proceed correctly he waves his head. They perfectly understand these motions, and by dint of perseverance on the part of the teacher, and attention and practice on theirs, acquire the habit of piping, which never leaves them till death. It is, however, observable, that, though all the bulfinches have the same advantages, as far as teaching goes, and the same power of voice, there are not above five out of a hundred that pipe correctly.

Blumenbach says, 'Both sexes readily learn to whistle tunes, to sing in parts, and even to pronounce words.'

TIT-LARK, &C.

Why do the tit-lark and yellow-hammer sing late?

Because they breed late—the latter very late; and Mr G. White lays it down as a maxim in ornithology, that as long as there is any incubation going on, there is music.

THE BUNTING.

Why is the bunting so destructive in rick-yards?

Because, unlike other birds, which burrow into the stack, the bunting deliberately unroofs the rick, by seizing the end of the straw thatching, and drawing it out to search for any grain the ear might yet contain. Mr Knapp saw a rick of barley thus unroofed, so that the immediate removal of the corn became necessary.

THE CHAFFINCH.

Why are chaffinches, in some parts, called 'twinks' and 'pinks'?

Because of their constant repetition of one note, when alarmed or in danger.

THE CANARY-BIRD.

Why is the Canary-bird so called?

Because it was first brought to Europe from the Canary Islands, about the commencement of the sixteenth century; but has since deviated into many varieties.

THE LINNET.

Why is the linnet among the least solitary of birds?

Because it frequents open commons and gorsy fields, where several pairs, without the least rivalry or contention, will build their nests and rear their offspring in the same neighbourhood. This duty over, the families unite, and form large associations, feeding and moving in company, as one united household; and, resorting to the head of some sunny tree, they will pass hours chattering with each other in a low and gentle note; and they will thus regularly assemble during any occasional bright gleam throughout all the winter season—

> And still their voice is song,

which, heard at some little distance, forms a very pleasing concert, innocent and joyous.—*Knapp.*

THE SPARROW.

Why ought sparrows to be protected?

Because a single pair of sparrows, during the time they are feeding their young, will destroy about 4,000 caterpillars weekly.—*Bewick.*—They feed their young also with many winged insects; in London, it is presumed, chiefly with flies.—*Jennings.*

THE NIGHTINGALE.

Why are not nightingales heard in Devonshire and Cornwall?

Because it is presumed that these birds come over to us from the Continent at the narrowest passage, and do not stroll so far westward. The failure of them in Northumberland and Scotland is, of course, attributable to the want of warmth.—*G. White.*

THE DIPPER.

Why is a certain bird called the dipper?

Because it is enabled to sink to the bottom of the water in pools, and walk thereon, like the hippopotamus among quadrupeds.

THE REDBREAST.

Why is it said by Pliny, that the redbreast is only se in winter?

Because the robin loses nearly all the characteristi

colour from its breast in the summer, when it moults, and only recovers it on the approach of autumn.—*Knapp.*

Why are redbreasts called autumn songsters?

Because in spring and summer their voices are drowned and lost in the general chorus; in autumn their song becomes distinguishable.—*G. White.*

Why is the robin the last bird that retires in the evening?

Because its fine, large eyes are fitted to receive all, even the weakest, rays of light that appear. The worm is its food too, and few that move upon the surface escape its notice.

Why do redbreasts and wrens, in the winter, haunt out-houses, stables, and barns?

Because they may there find spiders and flies, that have laid themselves up during the cold season. —*G. White.*

THE WHEATEAR.

Why is the wheatear highly prized?

Because, in an unfortunate hour, it has been called the English ortolan, and is pursued as a delicate morsel through all its inland haunts, when hatching and feeding its young, the only period at which it frequents our heaths.—*Knapp.*

THE MARTIN.

Why do house-martins build their nests only in the morning?

Because the work of the nest, chiefly of dirt or loam, may not, while it is soft and green, pull itself down by its own weight, but have sufficient time to harden and dry.—*G. White.*

Why do martins usually build to a north-east or north-west aspect?

Because the heat of the sun may not crack or destroy their nests.—*G. White.*

Why are martins less agile than swallows?

Because their wings and tails are shorter, wherefore they are not capable of such surprising turns, and quick and glancing evolutions, as the swallow.—*G. White.*

Why is the nest of the house-martin so frequently destroyed?

Because, in July and August, when it usually brings out its young, one rainy day, attended with wind, will moisten the earthy nest, the cement then fails, and all the unfledged ones are dashed to the ground; and there are some places to which these poor birds are unfortunately partial, though their nests are annually washed down. The parent birds at times seem aware of the misfortune that awaits them; as, before the calamity is completed, we may observe them, with great anxiety hovering about their nests. —*Knapp.*

THE SWIFT.

Why is the swift so called?

Because it is almost continually on the wing. It eats, drinks, collects materials for its nest, and even propagates on the wing; thus appearing to live in the air more than any other bird, and performing all functions there, save those of sleeping and incubation. In general they feed in a higher district than the other species; a proof that gnats and other insects do also abound to a considerable height in the air; they also range to vast distances; since locomotion is no labour to them, who are endowed with such wonderful powers of wing. Their powers seem to be in proportion to their levers, and their wings are longer in proportion than those of almost any other bird.— *G. White.*

Why are swifts out all day long on wet days?

Because many insects abide high in the air, even in rain, and the feathers of these birds are well preened to resist the wet. — *G. White.*

Why do swifts seldom settle on the ground?

Because, when down, they can hardly rise, on account of the shortness of their legs and the length of their wings; neither can they walk, but only crawl. Their bodies being flat, they can enter a very narrow crevice; and where they cannot pass on their bellies, they will turn up edgewise. — *G. White.*

TURTLE DOVES.

Why are turtle-doves emblematic of faithfulness in love?

Because of their adoption by the poets; — 'as to its highly prized fidelity and chastity, setting aside idle fables, it presents nothing superior to other birds which lead the same mode of life.' — *Blumenbach.*

The turtle-dove is also called the *culver.* Spenser, in a sonnet, has —

> Like as the culver on the bared bough,
> Sits mourning for the absence of her mate.

The cooing of the turtle-dove of the United States sounds very melancholy, but is, nevertheless, joyful — this being, in reality, the notes of its amorous affection.

The dove, in the wild state, breeds twice, but when domesticated, nine or ten times in the year; so that a single couple would, in four years, produce 14,672.

PIGEONS.

Why is the carrier pigeon so called?

Because of the service to which it was formerly applied, particularly in the Levant, of carrying letters. It appears that as soon as young pigeons are hatched, a whitish ash-coloured fluid is secreted in their crop, both in the male and female, in abundance, with which they feed for some time the young before they feed them with grain; so that, though *pigeons' milk* would be considered a solecism, yet this fluid seems to be very like milk in its properties. — *Jennings.*

Why are such numbers of London pigeons lost during the winter?

Because of the slight falcon, which takes up its abode every year, from October and November, until the spring, upon Westminster Abbey, and other churches in the metropolis.

THE RAIL.

Why is the rail, in Germany, called the King of the Quails?

Because it was formerly supposed to head them in their migrations.

Why does a partridge sometimes tumble along before a sportsman?

Because she may draw away the dog from her helpless covey. — *G. White.*

Why is it erroneous to suppose that black game drive away red grouse?

Because the two species require very different kinds of cover, and will never interfere. — *Sir W. Jardine.*

Why are the spurs of cocks of great strength?

Because they are supported in the centre by bone.

Why are the bones of fowls sometimes of a red tint?

Because madder, a plant yielding a red colour, has been mixed with their food. The nature of the food, generally, also exercises a considerable influence over the colour of their bones.

THE PEACOCK.

Why is it improper to call the long feathers of peacocks a tail?

Because the feathers do not grow from the rump, but all up the back. A range of short, brown, stiff feathers, about six inches long, fixed in the rump, is the real tail, and props up the long feathers, or train, which is top-heavy when set on end. By a strong muscular vibration, these birds can make the shafts of their long feathers clatter like the shafts of a sword-dancer. — *G. White.*

Why were peacocks and pheasants the peculiar food of knights?

Because they were said to be the nutriment of lovers, and the viand of worthies. — *Mills.*

Why were the highest honours conferred on peacocks?

Because knights associated them with all their ideas of fame, and vowed by the peacock, as well as by the ladies, to perform their highest enterprises. — *Mills.*

THE HERON.

Why do herons, in flying, seem encumbered with too much sail for their light bodies?

Because of their vast hollow wings, which are necessary in carrying burdens, such as large fishes, &c. — *G. White.*

THE CURLEW.

Why is the stone-curlew so called?

Because, when hatched, the young run immediately from the egg, like partridges, &c; and are withdrawn to some flinty field by the dam, where they skulk among the *stones*, which are their best security; for their feathers are so exactly the colour of our gray spotted flints, that the most exact observer, unless he catches the eye of the young bird, may be eluded. — *G. White.*

WOODCOCKS.

Why do poachers light fires on the coast, to catch woodcocks?

Because woodcocks, migrating during the night, and being attracted by the light, bend their course thither; in which manner great numbers are annually destroyed.

Why are the nests of woodcocks and fieldfares so rarely found in England?

Because those birds leave us in the spring, in order to cross the seas, and to retire to some districts more suitable to the purpose of breeding. 'That the former pair before they retire,' observes Mr White, 'and that the hens are forward with egg, I myself, when I was a sportsman, have often experienced.' — *Nat. Hist. of Selborne.*

THE RUFF.

Why is a certain bird called 'the Ruff'?

Because the neck and ear feathers are much produced in the breeding season, in the males, the heads of which are in part naked. — *Fleming.*

PHE PETREL..

Why were petrels, in past times, thought to predict a storm?

Because they seem to repose in a common breeze, but, upon the approach, or during the continuation, of a gale, they surround a ship, and catch up the small animals which the agitated ocean brings near the surface, or any food that may be dropped from the vessel. Whisking like an arrow through the deep valleys of the abyss, and darting away over the foaming crest of some mountain wave, they attend the labouring bark in all her perilous course. When the storm subsides, they retire to rest, and are no more seen. Our sailors have, from very early times, called these birds 'Mother Cary's Chickens.' — *Knapp.*

The inhabitants of the Faroe islands use them as lamps: they pass a wick through their bodies, which, when lighted, burns a long time, from the quantity of fat they contain. — *Blumenbach.*

THE SWAN.

Why has the swan the epithet of mute?

Because it utters no sound except its hissing.

Why has a 'Swan with Two Necks' been adopted as a tavern-sign?

Because, it appears, from the roll of swan's marks in the time of Henry VIII, that the king's swans were

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double marked, and had what were called *two nicks*, or notches. The term, in process of time, not being understood, a double animal was invented, with the name of the 'Swan with Two *Necks*.'—*The Mirror*, 1828.

Why are certain civic excursions on the Thames called 'swan-hopping'?

Because of its corruption from swan-*upping*, or the taking-up of swans, performed annually by the swan companies, with the Lord Mayor at their head, for the purpose of marking the birds.—*The Mirror*, 1828.

Why is a black swan no longer a proverbial rarity?

Because it is now found in great numbers in Van Diemen's Land, in New South Wales, and on the western coast of New Holland. The latter settlement, Swan River, has been so named from the flocks of black swans on its banks.

DUCKS.

Why is the finest down of the eider-duck called 'live' down?

Because it is found in the nest: that which is plucked from the dead bird is little esteemed.

Eider-down is imported chiefly from Iceland, and other northern countries. It is collected from the nests of birds; if the nest be deprived of its down, the female takes a fresh quantity from her breast; but, if the nest be a second time deprived of its down, she cannot supply it: the male then takes from his breast the necessary lining.—*Selby.*

Why have the bills of ducks a soft covering?

Because it supplies them with a real sense of taste; this covering being supplied with exceedingly large cutaneous nerves. Accordingly, it is easy to remark the manner in which ducks *probe*, as it were, the puddles, in search of their food, where they cannot be guided by their sight or smell.—*Blumenbach.*

Why do the wedge-like forms of flocks of wild-geese so often change during their flight?

Because, it is conjectured, of the leader of the van quitting his post at the point of the angle through fatigue, and leaving his place to be filled by another, himself dropping into the rear.

Why is the pied oyster-catcher so called?

Because it feeds on oysters and limpets, and its bill is so well adapted to force asunder the valves of the one, and of raising the other from the rock, that 'the Author of nature,' as Derham says, 'seems to have framed it purely for that use.'

FOREIGN BIRDS.

Why has it been thought that the tropical regions are deficient in birds of song?

Because, from the abundance of the *picæ* tribe, such as parrots, and some others of harsh note, it is probable that their sounds, in the tropical woods, often overpower and confound the more soft and sweet modulations of the warbler tribe. Still, it is a very unfounded notion that in the New World the brilliant hues of the birds take the place of the power of song. On the contrary, it would appear, from Wilson's *American Ornithology*, that the American song-birds are infinitely more numerous than those of Europe, and many of them superior to our most celebrated songsters.

VULTURES.

Why was the vulture held sacred by the Egyptians?

Because it was extremely serviceable in destroying mice, lizards, &c; whence they have frequently represented it in the hieroglyphics on their obelisks, the coverings of their mummies, &c. — ***Blumenbach.***

Why is a certain species called 'the King of the vultures'?

Because it has been placed at the head of the vulture tribe, on account of the superior beauty of its external appearance. Waterton, a recent traveller, asserts, that when *the king of the vultures* is present, the inferior species do not attempt to touch the prey till *the king* is satisfied.

Why are marine shells to be found buried in the plains, or in the sides of the mountains, of South Africa?

Because they have been carried there by birds, and not, as has been generally supposed, by eruptions of the sea. Mr Barrow, who is of this opinion, tells us, in confirmation of it, that 'there is scarcely a sheltered cavern in the sides of the mountains that rise immediately from the sea, where living shell-fish may not be found any day in the year. Crows even, and vultures, as well as aquatic birds, detach the shell-fish from the rocks, and mount with them into the air: shells, thus carried, are said to be frequently found on the very summit of the Table Mountain. In one cavern, at the point of Mussel Bay,' he adds, 'I disturbed some thousands of birds, and found as many thousands of living shell-fish, scattered on the surface of a heap of shells, that, for aught I know, would have filled as many thousand wagons.' The story, therefore, of the ancient philosopher, whose bald pate one of these unlucky birds mistook for a stone, and dropped a shell upon, thereby killing at once both fish and philosopher, is not so tramontane as to stumble all belief.

PARROTS.

Why have parrots, in general, striking peculiarities in their manners?

Because they have the power of using their feet almost like hands; as for carrying food to their mouths, scratching behind their heads, &c. When they walk on the ground, they tread not merely on the claws, like other birds, but on the whole of the foot. Their hook-shaped upper mandible is articulated, very moveable, and serves the purpose of a third foot in climbing.

Why is the Guinea parrot, in French, called 'l'inséparable'?

Because it has been said, but untruly, that they must always be kept in pairs, a single one not surviving the loss of its mate.

Why are many families of parrots found only in districts of very limited extent?

Because their wings are short, and unfitted for long flights. This is, at least, one cause. In the Philippines, for instance, many families of parrots are confined to particular islands, and never met with on others lying in the immediate vicinity. — *Blumenbach.*

THE TOUCAN.

Why is the toucan also called the 'Egg-sucker'?

Because it chiefly feeds on the eggs found in other birds' nests.

Why has the toucan a broad and long bill, covered with branches of nerves?

Because the nests in which it finds its food are often very deep and dark, and this provision enables the bird to feel its way as accurately as the finest and most delicate finger could.

WOODPECKER.

Why is the downy wood-pecker so destructive to the orchards of North America?

Because it makes one hole close to another, in a horizontal line, till it has completed a circle of holes all round the tree.

RED-CREEPER.

Why is the hook-billed red-creeper so highly-prize in the Sandwich Isles?

Because the ingenious natives manufacture various articles of ornament and dress, as helmets, and even entire mantles, with its carmine red feathers.

HUMMING-BIRD.

Why are humming-birds so called?

Because they are almost continually on the wing, uttering like bees, and making a humming noise. hey are so small as to be worn as ear-rings by the ndian ladies. When dried, the least of them weigh only about twenty grains each. The nest is of cotton, nd about the size of a walnut, with two eggs about as big as peas.

AMERICAN CROW.

Why does the carrion-crow of America differ mateially from the bird so common in England?

Because of its greater rapacity as well as tameness. Thus, in the cities where they are protected, they enter he very kitchen, and feed on whatever is thrown to hem, even vegetables. If unmolested they will remain n the same premises for months, flying to the roof at lusk to spend the night. Six or seven are often seen tanding, in cold weather, round the funnel of a chimney, apparently enjoying the heat from the smoke. Notwithstanding the penalties imposed by law, a number of these birds are destroyed on account of heir audacious pilfering. They seize young pigs as great dainties. They watch the cackling hen, in order to get the fresh egg from her nest; and they will not hesitate to swallow a brood of young ducks. In order to keep them from the roofs of houses, where their dung is detrimental, the inhabitants guard the top with broken pieces of glass fastened in mortar; and they often kill them by throwing boiling water upon them. No fewer than two hundred of these birds are daily fed by the city of Natchez.—*Audubon.*

BIRD OF PARADISE.

Why were birds of paradise formerly thought to be without feet?

Because they were and are worn as ornaments in

India, on account of their beautiful plumage; and when sold for this purpose, the Passous still *cut off the feet.* — *Blumenbach.*

INDICATOR.

Why is the indicator also called the 'honey-cuckoo'?

Because, like the honey-bear,* it obtains its food from the nests of the wild bees.

Why is the indicator protected by the Hottentots?

Because, by its notes, it is said to conduct them to the nests of the wild bees.

LOXIA.

Why is the pensile loxia of the Cape and Madagascar so called?

Because it builds a remarkable nest, in the vicinity of water, in shape almost like a retort, with a depending neck for ingress and egress, and so disposed that the aperture is close to the water. — *Blumenbach.*

Why do many birds of warm climates build pendulous nests, which are attached to the extreme branches of trees?

Because there only are they secure from their enemies, the snakes and monkeys.

MOCKING-BIRD.

Why is the mocking-bird so called?

Because, in addition to the fulness and melody of his original notes, he has the faculty of imitating the notes of all other birds, from the humming-bird to the eagle. In measure and accent he faithfully follows his originals, while in force and sweetness of expression he greatly improves upon them. A bystander might suppose that the whole feathered tribes had assembled together on a trial of skill, each striving to produce his utmost effect, so perfect are his imitations. He often deceives the sportsman, and even birds themselves are sometimes imposed upon by this, admirable music. In confinement he loses little of the power or energy of his song. He whistles for the dog: Cæsar starts up, wags his tail, and runs to meet his master. He cries like a hurt chicken, and the hen hurries about, with feathers on end, to protect her injured brood. He repeats the tune taught him, though it be of considerable length, with great accuracy. He runs over the notes of the canary, and of the red-bird, with such superior execution and effect, that the mortified songsters confess his triumph by their silence. His fondness for variety some suppose to injure his song. His imitations of the brown thrush are often interrupted by the crowing of cocks; and his exquisite warblings after the blue-bird, are mingled with the screaming of swallows, or the cackling of hens. During moonlight, both in the wild and tame state, he sings the whole night long. The hunters, in their night excursions, know that the moon is rising the instant they begin to hear his delightful solo. — *Rennie.*

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* See Quadrupeds, p. 18.

Mr Southey, in his notes to *Madoc*, says, 'A negress was once heard to exclaim, 'Please God Almighty, how sweet that mocking-bird sing! he never tire.' By day and night it sings alike; when weary of mocking others, the bird takes up its own natural strain, and so joyous a creature is it, that it will jump and dance to its own music. This bird is perfectly domestic, the Americans holding it sacred. Would that we had more of these humane prejudices in England, if that word may be applied to a feeling so good in itself, and in its tendency.'

SNOW-BUNTING.

Why is the snow-bunting so called?

Because it is the only living creature that is found at the height of 2000 feet above the limit of perpetual snow. The snow-finch is found on Caucasus and the European Alps.

FLY-CATCHER.

Why is the red-eyed fly-catcher in the West Indies called 'Tom Kelly'?

Because his notes are in short emphatic bars of two, three, or four syllables; and on listening to his song, you may fancy you hear the words, 'Tom Kelly! whip! Tom Kelly!' very distinctly. -- *Rennie.*

TAILOR-BIRD.

Why is the tailor-bird so called?

Because of the art with which it makes its nest;—sewing some dry-leaves to a green one at the extremity of a twig, and thus forming a hollow cone, which it afterwards lines with feathers. It is found in India, and is smaller than a wren.—*Blumenbach.*

GULL-TEAZER.

Why is the sea-swallow also called 'the gull teazer'?

Because it is frequently seen to pursue and persecute the lesser gulls, till they disgorge their food, which it dexterously catches before it reaches the water.

AMERICAN PIGEON.

Why are the wild pigeons of America so celebrated?

Because of their great power of flight, which enables them, when in need, to survey and pass over an astonishing extent of country in a very short time. This is proved by facts known to the greater number of observers in America. Pigeons, for example, have been killed in the neighbourhood of New York, with their crops still filled with rice, collected by them in the fields of Georgia and Carolina, the nearest point at which this supply could possibly have been obtained; and as it is well ascertained, that, owing to their great power of digestion, they will decompose food entirely in twelve hours, they must have travelled between 300 and 400 miles in six hours, making their speed at an average of about one mile in a minute; and this would enable one of these birds, if so inclined, to visit the European continent, as swallows undoubtedly are able to do in a couple of days.

Such are their numbers, that the air is described as 'literally filled with pigeons; the light of the noon-day becomes dim, as during an eclipse.'

It may not, perhaps, be out of place to attempt an estimate of the number of pigeons contained in one of those mighty flocks, and the quantity of food daily consumed by its members. The inquiry will show the astonishing bounty of the Creator in his works, and how universally this bounty has been granted to every living thing on the vast continent of America.

We shall take, for example, a column of one mile in breadth, which is far below the average size, and suppose it passing over us without interruption for three hours, at the rate mentioned above, of one mile per minute. This will give us a parallelogram of 180 miles by 1, covering 180 square miles; and allowing two pigeons to the square yard, we have 1,115,136,000 pigeons in one flock; and as every pigeon consumes fully half-a-pint of food per day, the quantity must be 8,712,000 bushels per day, which is required to feed such a flock. —*Audubon.*

THE WHIP-POOR-WILL.

Why is a certain American bird called the 'Whip-poor-Will'?

Because its notes seem pretty plainly to articulate the words *whip-poor-will*; the first and last syllables being uttered with great emphasis, and the whole in about a second to each repetition; but when two or more males meet, their whip-poor-will altercations become much more rapid and incessant, as if each was straining to overpower or silence the other.

On or about the 25th of April, if the season be not uncommonly cold, the whip-poor-will is heard in Pennsylvania, in the evening, as the dusk of twilight commences; or in the morning, as soon as the dawn has broke. The notes of this solitary bird, from the ideas which are naturally associated with them, seem like the voice of an old friend, and are listened to by almost all with great interest. At first they issue from some retired part of the woods, the glen, or mountain; in a few evenings, perhaps, we hear them from the adjoining coppice, the garden fence, the road before the door, and even the roof of the dwelling-house, — hours after the family have retired to rest. Some of the more ignorant and superstitious consider this near approach as foreboding no good to the family, — nothing less than the sickness, misfortune, or death, of some of its members. Every morning and evening his shrill and rapid repetitions are heard from the adjoining woods; and when two or more are calling at the same time, as is often the case in the pairing season, and at no great distance from each other, the noise, mingling with the echoes from the mountains, is really surprising. Strangers, in parts of the country where these birds are numerous, find it almost impossible for some time to sleep; while, to those acquainted with them, the sound often serves as a lullaby, to assist their repose. Towards midnight they generally become silent, unless in clear moonlight, when they are heard with little interruption till morning. — *Rennie.*

This is one of the goat-suckers, which are chiefly American birds. The European species has been mentioned at p. 102. Besides the whip-poor-will, Waterton mentions four kinds that have each a peculiar set of notes. One utters, ‘Who are you, who, who, who are are?’ another, ‘work away, work, work away;’ another, ‘Willy come go;’ and another, a large bird, the size of the English wood-owl, ‘Ha, ha, ha, ha, ha, ha;' which sounds are uttered like a on in deep distress, — the departed voice of a it-murdered victim. The plaintive cries of all e are uttered throughout the night.

NEGRO-FOWL.

hy is the negro-fowl so called?

ecause it has a black skin. It is principally from ago, in the Cape de Verd Islands, where other ies of birds are said to present the same pecuty. — *Blumenbach.*

CURASSOW.

hy is the curassow improperly so called?

ecause it has been corrupted from Curaçoa, the ie of an island where the bird is found in great ndance.

THE OSTRICH.

hy is the ostrich enabled to run with such celerity?

ecause his bones, like those of other birds, are ow; he has also air vesicles similar to other s, which, notwithstanding he cannot leave the h, enable him, by the assistance of his muscular to run with astonishing swiftness.

hy do the feathers of the ostrich differ from those her birds?

cause they have their shaft exactly in the mid- whereas the feathers of other birds have the s broader on one side than the other.

hy does the ostrich lay and hatch her eggs in the l?

ecause her form being ill-adapted to that pro- , she has a natural oven furnished by the sand, the strong heat of the sun.

hy has the ostrich been so long known for its stuly?

ecause of its mention in the book of Job, xxix,

16, 17: 'She is hardened against the youn
as though they were not hers: Because Go
deprived her of wisdom, neither hath he in
to her understanding.'

Some accounts exonerate the ostrich from
the most stupid bird in the creation. T
been proved by the experiment of taking
away, or by putting one in addition. In eith
she destroys the whole by smashing them w
feet. Although she does not attend to sec
selecting a situation for her nest, she will fo
if the eggs have been handled. It is also s
she rolls a few eggs thirty yards from the n
cracks the shells, which, by the time her
come forth, being filled with maggots, and
with insects, form the first repast of he
brood. The male bird is said to take upon
the rearing of the young. If two cock bird
each with a family, they fight for the sup
over both; for which reason an ostrich ha
times under his tutelage, broods of differe
— *General Miller.*

Each of the ostrich's eggs, of which it lay
thirty, contains as much as twenty-four hen

*Why are young ostriches seldom domesticated,
they soon become attached to those who caress*

Because they are troublesome inmates:
ing about the house, they will, when full
swallow coin, shirt-pins, and every small a
metal within their reach.

CASSOWARY.

Why is the New Holland cassowary hunted

Because it abounds with oil, which is
leather, &c. Its flesh, when cooked, more re
beef than fowl. It is hunted with dogs, the
the jaw of which, according to Wentworth,
times fractures by a single kick. A fine pair

birds may be seen in the gardens of the Zoological Society.

SPOONBILL.

Why is the spoonbill so called?

Because of its singular bill having the shape of a *spoon*. Its singularity does not, however, consist merely in its shape, but also in its structure: for it is not hard, like the beaks of other birds, but soft and flexible like leather. — *Jennings.*

HORNED SCREAMER.

Why has the horned screamer two spurs on each wing?

Because it may defend itself against some noxious animals which infest the native regions of this bird — the fenny and marshy parts of South America. Notwithstanding this armour it is said that this bird is the most gentle of all animals; that the male and female are always found in pairs, and that, if one dies, the other does not long survive.

BITTERN.

Why does the great American bittern emit a strong light from its breast?

Because the light, which is equal to that of a common torch, may illuminate the water, so as to enable the bird to discover its prey. —*American Naturalist.*

IBIS.

Why was the ibis so famed among the ancient Egyptians?

Because it was the symbol of the overflowing of the Nile, from its arrival, breeding season, and departure, coinciding with the commencement, &c, of the fertilizing inundation of that river.

It has been frequently represented on their hieroglyphical monuments, and prepared, like the human bodies, in the form of mummies, great numbers being placed in certain vaults. At present it is rather uncommon, at least in Lower Egypt. —*Blumenbach.*

TRUMPETER.

Why is the trumpeter so called?

Because of its harsh, uncommon cry, not unlil child's trumpet, with which it follows people thro the streets, in Brazil and Guinea, so that it is d cult to get rid of it. — *Waterton.*

DARTER.

Why is the darter of Brazil so called?

Because it has a very long neck, which the mal can roll up spirally, and by that means dar head at the fish it wishes to seize.

TROPIC BIRD.

Why is the tropic bird so called?

Because it lives in the open seas between the pics, chiefly on the flying fish.

HORNBILLS.

Why is the flesh of the Indian hornbill pecul aromatic?

Because it feeds on wild nutmegs, which g abundantly in its native place, the Molucca Isla

Why is another species of the above-mentioned called the jealous hornbill?

Because he feeds the female during her inc tion; and, during his absence in search of f should he find on his return, the marks of [illegible] bird near the nest, he will, it is said, inclose th male in the nest, and leave her to perish. — *E field.*

SOCIABLE NEST.

Why is the sociable grossbeak so called?

Because it lives in vast tribes, from 800 to 10 times, under one common roof, containing their se al nests, which are built on a large species of mim

INDIAN GROSSBEAK.

Why is it popularly believed in India that the b or grossbeak lights the chambers of his nest with

flies, which he catches alive at night, and confines with moist clay or cow-dung?

Because such flies are often found in his nest, where pieces of cow-dung are also stuck; but, as their light could be of little service to him, it seems probable that he only feeds on them.

FAITHFUL JACANA.

Why has the jacana the epithet of 'faithful?'

Because it is kept by the natives of South America to wander with the poultry, and defend them from birds of prey, which it does by the spurs on its wings; it never deserts its charge, but brings them home safely at night.

BELL-BIRD.

Why is the variegated chatterer of South America also called the bell-bird?

Because its voice is, for about six weeks only, in December and January, like the noise of a cracked bell. The caruncultated chatterer is also called the bell-bird, from its notes being composed of two syllables—*in an*, uttered in a drawling tone, which (Mr Waterton says) may be heard three miles distant.

SAWING BIRD.

W[illegible] is the Chilian sawing bird so called?

B[illegible]se, with its straight, and serrate, or notched bill, it cuts down fresh vegetables, as with a *saw*.

CAT BIRD.

Why is the cat bird so called?

Because it mews like a cat, or rather, like a young kitten. It also imitates the notes of other birds, and attacks snakes.—*Wilson.*

RICE BIRD.

Why is the rice bird so called?

Because, in Cuba, it is found in great numbers during the season of the rice crop; but no sooner is the rice gathered, than it removes to Carolina, and meets the same harvest in that country, where it remains till the rice season is past.

COOLIES.

Why do coolies differ from other birds?

Because they do not perch, nor leap from branch to branch, nor do they even walk nimbly; for, resting on the whole length of the leg, they drag the belly after them. At the Cape of Good Hope they are called *Mouse Birds*, from their soft plumage, and their frequently creeping about the roots of trees. — *Jennings.*

THE BOOBY.

Why is the booby so called?

Because it is an indolent, senseless, and cowardly bird, submitting to all sorts of depredations upon its happiness with indolent imbecility; yet it is occasionally, when much excited, ferocious. The man-of-war bird no sooner perceives it in the air, than it pounces upon it, not to destroy it, but to make it disgorge the fish which it has swallowed, which is caught by the voracious plunderer before it reaches the water. — *Jennings.*

THE PELICAN.

Why has the pelican a pouch attached to her bill?

Because it answers the purpose of a crop, and is used by the bird to contain food both for herself and her young, which, when hatched, are fed with the fishes that have been for some time macerated in the pouch; this, when distended, will contain ten quarts. Great numbers of pelicans are killed for their pouches, which are converted by the native Americans into purses, &c. When carefully prepared, the membrane is as soft as silk, and sometimes is embroidered by the Spanish ladies for work-bags, &c.

It is used in Egypt by the sailors, whilst attached to the two under chaps, for holding or bailing water.

Why was the pelican formerly thought to feed her young with her blood?

Because, in disgorging the food from the pouch for the young, the bird presses the bottom of the sack upon her breast, and thus the contents are discharged.*

THE CORMORANT.

Why has the cormorant a small sabre-shaped bone at the back of its vertex?

Because this bone may serve as a lever in throwing back the head, when the animal tosses the fishes which it has taken into the air, and catches them in its open mouth. This conjecture is by Blumenbach, who, however, observes, that the same motion is performed by some other piscivorous birds, which are not provided with this particular bone.

Why was the cormorant formerly domesticated in this country?

Because it was trained to fish for its owner; it is still used in China for this purpose.

THE MAN-OF-WAR.

Why is the man-of-war bird so called?

Because it is one of the most formidable tyrants of the ocean. When in flocks, they attack sometimes even man himself. It is said that a cloud of them attacked a crew of French sailors upon the Island of Ascension, and, till some of them were struck down, endeavoured to snatch the meat from their hands. — *Jennings.*

THE ORNITHORYNCUS.

Why is the ornithoryncus said to form the connecting link between the bird and beast?

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* See the Vignette.

Because it has a bill like a duck, and paws webbed similar to that bird, but legs and body like those of a quadruped, covered with thick, close hair, with a broad tail to steer by. It is believed to lay eggs; it bears a claw on the inside of its foot, with a tube therein, through which it emits a poisonous fluid into the wounds which the claw inflicts.*

Why have birds a gizzard?

Because it may answer the purposes of teeth to masticate their food; the gizzard being composed of thick and tough muscular substance, small in size, but more powerful in its action than the strongest jaw-bone. It consists of four distinct muscles—a large hemispherical pair at the sides, and a small pair at the two ends of the cavity. By their alternate action these muscles produce two effects; the one, a constant friction on the contents of the cavity, the other, a pressure upon them. These muscles are lined with a cuticle which is extremely callous, and which often becomes cartilaginous, and even horny. Reaumur and Spallanzani compelled geese and other birds to swallow needles, lancets, and other hard substances; in a few hours after which, the birds were killed and examined;—the needles [illegible] lancets were uniformly found broken off and [illegible]ed, without the slightest injury having been sustained by the stomach. Swallowing pebbles also aids the action of the gizzard upon the food, the stones in some measure serving the purpose of teeth. Mr Hunter observed that the size of the pebbles is always in proportion to that of the gizzards. In the gizzard of a turkey he counted two hundred; in that of the goose, a thousand.—(*See page* 84.)

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* Cunningham's Sketches of New South Wales.—See also *Quadrupeds*, page 58 of the present volume.

Why does the gastric juice, in its effects, differ in different animals?

Because of the varieties of food on which they subsist. Thus, in birds of prey, as kites, hawks, owls, it only acts upon animal matter, and does not dissolve vegetables. In other birds, and in all animals feeding on grass, it dissolves vegetable matter, as grass, but will not touch flesh of any kind. This has been ascertained by making them swallow balls with meat in them, and several holes drilled through, to let the gastric juice reach the meat: no effect was produced upon it.

We may farther observe that there is a most curious and beautiful correspondence between this juice in the stomach of different animals, and the other parts of their bodies, connected with the important operations of eating and digesting their food. The use of the juice is plainly to convert what they eat into a fluid, from which, by various other processes, all their parts, blood, bones, muscles, &c, are afterwards formed. But the food is first of all to be obtained, and then prepared by bruising, for the action of the juice. Now, birds of prey have instruments, their claws and beak, for tearing and devouring their food, (which is animals of different kinds,) but [illegible] instruments are useless for picking up and [illegible] seeds; accordingly they have a gastric juice which dissolves the animals they eat; while birds which have only a beak fit for pecking, drinking, and eating seeds, have a juice that dissolves seeds, and not flesh. Nay more, it is found, that the seeds must be bruised before the juice will dissolve them:—this is found by making the experiment, in a vessel with the juice; and accordingly, the birds have a gizzard, and animals which graze have flat teeth, which grind and bruise their food before the gastric juice is to act upon it.

Why have some birds more air-cells than others?

Because the quantity of air which they individually contain, is proportioned to the influence which they exert on the locomotion of the body. Thus, in the eagle, and other birds of long flight, the bones which support the wings are filled with air; while in such as the puffin, whose wings are unequal to any lengthened flight, or the ostrich, which prefers to run, air-cells are found in the greatest numbers within the bones of the leg and thigh.

These air-cells generally exist externally, between the muscles: the bones themselves, which in the mammalia contain marrow, are, in birds, filled with air. It has also been observed, by Mr Green, the celebrated anatomist, that, in young birds, a medullary substance is often observable in the bones; but as they grow up to maturity, it becomes absorbed, and the bone empty.

The beauty of this contrivance is equalled only by its importance. Independently of a perfect supply of air being thus furnished at all seasons, for the purposes of respiration, without any inconvenience to the general system, the relative weight of the body is materially diminished, the difficulty of breathing in a very rarefied atmosphere is counteracted, and the necessity of a frequent respiration during rapid flight may be dispensed with.

Why have birds that do not fly wings?

Because they assist in balancing the bod[illegible]ey run.

Why are the necks of aquatic birds proportionally longer than those of land birds?

Because aquatic birds have to seek their food below the surface of the water on which they swim. The length of the neck generally increases in proportion to that of the legs. — *Blumenbach.*

Why does the neck of a bird acquire that double bend which makes it resemble the letter S?

Because the neck joints are not united by plane surfaces, but by cylindrical eminences, which admit of a more extensive motion, as they also constitute real joints. Four or five of the pieces only bend forwards, while the lower ones are confined to flexion backwards. — *Blumenbach.*

Why do birds stretch out their necks when flying?

Because they may become like sharp points, dividing the air, and diminishing the resistance.

Why are the beaks of birds so diversified in their form and structure?

Because each beak is adapted for receiving only certain kinds of food. Thus, some are long and pointed, others are broad and flat; others are hooked and curved.

Why is the freshness of an egg judged by its warmth?

Because the egg, like most other living beings, maintains a temperature considerably above that of the surrounding medium; and, as long as it is alive, it resists putrefaction, under degrees of heat and moisture, which cause it to run rapidly into the putrefactive process as soon as it is dead.

Why, in several species of birds, have the male and female different plumage?

Because, as the female ceases in her old age to lay eggs, she obtains the male plumage. — *Blumenbach.*

W[illegible]s the body of a newly hatched bird covered with hair [illegible]ad of feathers?

Because little tufts of hair, produced from one common bulb, are the rudiment of the future feather. In a few days a black cylinder appears, which opens at the extremity, and gives passage to the feather. The opposite end receives those blood-vessels, which supply the vessel-like substance in the barrel of the feather; when the stalk of the feather has received its complete growth, this vessel-like body is dried up, and presents the well known appearance called pith, in the barrel of quills.

Why are birds considered much less favoured spect to organs of touch than mammalia?

Because one extremity of their bodies is oc with the bill, and the other with a sort of ear der. The anterior appendices (or wings) are of mere locomotion; and the remaining por the body, or the extremities of the posterior dices, serve to give them a firm position on th legs. We find, however, that in these anim toes are more articulated than in mammali they are in a great degree capable of being ted from each other; and the nerves with they are furnished considerable. It may be in therefore, that the feet of birds would be to perfect organs of touch, if they were not u organs of locomotion; and that, the less th used for the latter purpose, the more perfect sense of touch. Accordingly, we find that take up their food with their feet, and conve their mouths. In birds of prey the sense is bly more acute, as their feet are little used f gression. In the gallinaceous birds, (as fowls) feet are constantly on the ground, and in the and cassowary, which do not fly, the epider outer skin) is thickened, and its sensibility quently diminished. — *Lawrence's Notes to bach's Comparative Anatomy.*

Why is it erroneous to accuse birds of destro buds of trees in spring?

Because it is not the buds, but the insec quenting them, of which the birds are in sea

Why are the banks of the Demerara so attra ornithologists?

Because the birds there are unrivalled in the birds of Cayenne excepted. Thus in pas the river, every now and then, the maam, mou, sends forth one long plaintive whistle, fr depths of the forest, and then stops; whi yelping of the toucan, and the shrill voice of the bird called pi-pi-yo, are heard during the interval. The campanero never fails to attract the attention of the passenger; at a distance of nearly three miles, you may hear this snow-white bird tolling every four or five minutes, like the distant convent-bell. From six to nine in the morning, the forests resound with the mingled cries and strains of the feathered race: after this they gradually die away. From eleven to three all nature is hushed, as in a midnight silence, and scarce a note is heard, save that of the campanero and pi-pi-yo; it is then that, oppressed by the solar heat, the birds retire to the thickest shade, and wait for the refreshing cool of evening. At sundown, goatsuckers skim along the trees on the river's bank, and, with owls, lament and mourn all night long. The houtou, a solitary bird, and only found in the thickest recesses of the forest, distinctly articulates 'houtou, houtou,' in a low and plaintive voice, an hour before sunrise; the maam whistles about the same hour; the hannaquoi, pataca, and maroudi, announce the sun's near approach to the eastern horizon; and the parrots and paroquets confirm his arrival there. — *Abridged from Waterton's Wanderings.*

Why are falcons distinguished as noble and ignoble?

Because the *noble* falcons seize their prey in the air during flight; for they never devour what has been killed or wounded by other birds; they must drink the blood of their victims warm or not at all. In all these birds the bill is very short, strong, and much hooked. The *ignoble* are inferior in many respects; the tooth of their bills is rounded off, and does not present an acute angle; while the wings are proportionally short, and consequently weaker. This second grand division of rapacious birds, is seldom, if ever, used in falconry.

These definitions are by a correspondent of the *Magazine of Natural History*, Vol. I. Another writer in that work thinks the term *noble* to have been applied, not to all such as take their prey in the air, — which definition would, he thinks, improperly exclude the eagles; these birds, according to Temminck and Montagu, pouncing their prey on the wing, — but to have been used to denote such as were used in falconry only, which was formerly the sport only of princes and *noble* persons.

Why are the gardens in and about London much more injured by insects, than those in comparatively distant parts of the country?

Because, partly, of the smaller number of insectivorous birds in and about the metropolis; and their scarcity is not, as frequently alleged, owing to the smoke, the number of houses, and the want of trees and food, because it is well known that every kind of bird will live, and thrive in cages in the heart of London — but to the number of bird-catchers, and, in some respect, the cats.

END OF PART IV.

KNOWLEDGE FOR THE PEOPLE:

OR THE

PLAIN WHY AND BECAUSE.

PART VIII.—ZOOLOGY—AMPHIBIA, FISHES, &c.

B

ZOOLOGY.

AMPHIBIA.

GENERAL ECONOMY.

Why are the bones of reptiles and fishes softer than those of quadrupeds and birds?

Because the former contain much less earthy matter than the latter. In some fishes, the earthy matter is so small, that the cartilage continues, during the whole life of the animal, soft, flexible, and elastic, as the spine of the lamprey; or a little more indurated (harder) as in the bones of the skate or shark. These fishes have been termed cartilaginous. Even in those fishes which are termed osseous, (or bony,) the cartilage bears a much greater proportion to the earthy matter than in quadrupeds.—*Fleming.*

Why may the circulation of reptiles be considered as imperfect?

Because only a part of the blood is aërated, which issues from the heart; and that portion, instead of proceeding directly to the different organs, is again mixed with the circulating fluid.—*Fleming.*

Why do Amphibia resemble Mammalia, and differ from Fishes?

Because they breathe with lungs; although these are of a much looser texture; and their respiration much more indeterminate, and less regular, than in the two classes of warm-blooded animals.—*Blumenbach.*

They are capable of living much longer without respiring, or in a vacuum, (as, for instance, toads in cavities, within trees, or blocks of stone); they can even endure for a time, an atmosphere of carbonic acid gas; and there are undoubted proofs of newts and frogs having lived in the stomachs of human beings, or that have recovered, after having been frozen perfectly hard.

Why are certain animals, as amphibia and fishes, called cold-blooded?

Because their temperature is greatly influenced by that of surrounding objects.

In this, and warm-blooded animals, as mammalia and birds, whose temperature is high, and not greatly influenced by the changes in the heat of external objects, the temperature is regulated by the vital powers of the animals; and limits are assigned, beyond which it is dangerous to pass.

The range of warm-blooded animals is confined; that of cold-blooded animals extensive.

Why have amphibia the remarkable facility and strength of reproduction?

Because of the force of their nerves, and the comparatively small size of their brain; as a consequence of which, the nerves are less dependent on the brain; the whole machine has less mobility, presents fewer indications of sympathy, and the whole life is more simple, and more purely vegetative, than in warm-blooded animals; whilst, on the other hand, the separate parts are endowed with a greater share of peculiar and independent vital power; whereas, a stimulus applied to one part, or one system of parts, does not, as in warm-blooded animals, excite others by sympathy.

We have thus an explanation of the tenacity of life in animals of this class; (frogs are known to leap about after the heart has been torn out, and tortoises to live for months, after the brain has been removed), and a similar explanation will apply to the long-continued power of motion, in parts of amphibia, when separated from the bodies; as the tails of newts, blindworms, &c.

As an instance of extraordinary reproduction, Blumenbach tells us of a large water-newt, one of whose eyes had been entirely extirpated; notwithstanding which, within ten months, a perfect new eye was formed, with cornea, pupil, lens, &c. and only differing from the eye on the other side, in being about half its size.

Why are amphibia considered slow in growth?

Because, for example, the frogs of these climates are incapable of producing until their fourth year; and yet reach what must be considered in proportion to the late period of puberty, the inconsiderable age of from twelve to sixteen years. On the other hand, it is known, that tortoises, even in captivity, have lived upwards of one hundred years; so that, by analogy, it may be supposed, that crocodiles, and the large serpents, reach a still more advanced age.—*Blumenbach.*

Why is the gullet of reptiles usually dilatable?

Because their teeth, in general, are fitted for retaining their food, rather than for masticating it.

One of the most remarkable instances of dilatation, was witnessed in a Boa, brought to Europe in 1817, in the vessel in which Lord Amherst returned from India. This boa, was only about 16 feet long, and 18 inches in circumference; but, on a live goat being thrust into his cage, he seized the poor creature by the fore-leg, with his mouth, and, throwing it down, it was instantly encircled in his folds; and, so quickly, that the eye could not follow the rapid motion of his long body, as he wound it round the goat; its cries became more and more feeble, and at last it expired. The snake, however, long retained his grasp, after it was motionless. He then slowly and cautiously unfolded himself, and prepared to swallow it. He commenced, by covering the dead animal over with his saliva; and then taking its muzzle into his mouth, he sucked it in as far as the horns would allow. These opposed some little difficulty, but they soon disappeared externally; yet their progress might be traced distinctly on the outside, threatening every moment to protude through the skin. The whole operation of completely gorging the goat occupied about two hours and twenty minutes; at the end of which time, the tumefaction was confined t the middle part of the body, or stomach; the superio parts, which had been so much stretched, having resumed their natural dimensions. He now coiled himself up again, and lay quietly in his usual torpid state for about a month, till his last meal appearing completely digested and dissolved, he was ready for othe food, which he devoured with equal facility. Betwee the Cape of Good Hope and St. Helena, he was, however, found dead in his cage; and, on dissection, th coats of the stomach were discovered to be excoriate and perforated by worms. Nothing remained of th goat, except one of the horns, every other part bein dissolved.

A boa, about 9 feet long, was exhibited in Londo in 1817. He was fed on live rabbits, ducks, &c which he also despatched, by coiling his body two o three times round them, crushing them to death, an then gulping them down by the aid of saliva.

Why are serpents, (as in the case of the boa just mentioned) enabled to swallow such large bodies whole?

Because the upper jaw is loosely connected with th head; and, in some species, admits of considerabl motion at the point of junction, by which means th mouth can be opened very wide.

Why do reptiles crawl?

Because the limbs are placed perpendicular to th mesial line; and, in the progressive motion, the bod is dragged along the ground, as the flexion and extension of the limbs are unable to elevate it above th surface.—*Fleming.*

Why may animals with many feet be said to glide along a surface?

Because their walking is performed by so uniform a motion, the feet not moving by pairs, but by divisions, containing from five to twenty, and upwards. The hairs on the rings of caterpillars, it may be here observed, likewise serve as feet, in assisting progressive motion.

Why have certain reptiles a serpenti-form motion?

Because they bring up the tail towards the head, by bending the body into one or more curves, then resting upon the tail, and extending the body, thus moving forward, at each step, nearly the whole length of the body, or one or more of the curves into which it was formed. In serpents, this motion is well displayed, whence its name; and, in some cases, it would appear, that they are assisted in it by means of their ribs, which act as feet. Among the *mollusca*, (or soft animals) and the *annulosa*, (or ring-jointed animals) the same kind of motion is performed, by alternate contractions and expansions, laterally and longitudinally, of the whole or parts of the body. The hairs or spines of many of the annulosa, assist their progress; while in others, the body is so soft and pliable, as easily to accommodate itself to the inequalities of the surface over which it glides, and derive assistance from these in its progress.

Why do reptiles become torpid during winter?

Because, chiefly, of the cold acting on a frame extremely sensible to its impressions. During the continuance of a high temperature, they remain active and lively; but when the temperature is reduced towards 40°, they become torpid, and in this condition, if placed in a situation where the temperature continues low, will remain torpid for an unknown period of time. Spallanzani kept frogs, salamanders, and snakes, in a torpid state, in an ice-house, where they remained three years and a half, and readily revived when again exposed to the influence of a warm atmosphere.

Why do reptiles respire very slowly during their torpidity?

Because the circulation of the blood is carried on independent of the action of the lungs. Even in a tortoise, kept awake during the winter by a genial temperature, the frequency of respiration was observed to be diminished.

The circulation of the blood is diminished, in proportion to the degrees of cold. Spallanzani counted from 11 to 12 pulsations in a minute in the heart of a snake, at the temperature of 48°, whose pulse in general, in warm weather, gives about 30 beats in the same period. Dr. Reeves observed the number of pulsations in toads and frogs, to be 30 in a minute, whilst they were left to themselves in the atmosphere, of which the temperature was 53°; when placed in a medium, cooled to 40°, the number of pulsations was reduced to 12 within the same period; and when exposed to a freezing mixture at 26°, the action of the heart ceased altogether. The powers of digestion are likewise equally feeble.

Why has the immediate cause of torpidity in reptiles, been ascertained with more precision than in animals with warm blood?

Because this condition with them, does not depend on the state of the heart, the lungs or the brain; for these different organs have been removed by Spallanzani, and still the animal became torpid, and recovered according to circumstances. Even after the blood had been withdrawn from frogs and salamanders, they exhibited the same symptoms of torpidity, as if the body had been entire, and all the organs capable of action.

Why are there but few reptiles in the cold countries of the globe?

Because they are so easily acted upon by a cold atmosphere; while in those countries enjoying a high temperature, they are formed of vast size, of many different kinds, and in great numbers.

REPTILES.

TORTOISE TRIBE.

Why are tortoises enabled to bear such immense weights?

Because most of them are covered with a firm long shell, the upper part of which is connected with the spine and ribs, and is covered by the broad horny plates, which in many species are so firm, and of such beautiful colours as to be employed for various purposes of art. There are usually thirteen such plates in the middle, and twenty-four round the edges. The under-shell, covering the belly, is somewhat smaller than the upper, with openings for the head, the tail, and the feet.

In a Singapore newspaper we read, that the tortoise, when caught by the Eastern islanders, is suspended over a fire, kindled immediately after its capture, until the effect of the heat loosens the shell, so that it can be removed with the greatest ease. The animal, now stripped and defenceless, is set at liberty. If caught in the ensuing season, or at any subsequent period, it is asserted that the unhappy animal is subjected to a second ordeal of fire, rewarding its captors this time, however, with a very thin shell.

We do not quote this fact for its refinement of cruelty, but to prove the tenacity of life in the tortoise, which must be accounted a very singular fact in natural history.

Blumenbach observes, that the peculiar and distinct form of this consequently isolated genus, forms a very strong proof of the non-existence of the supposed gradation of objects in nature.

Why have animals of the tortoise tribe, usually jaws provided with a horny covering, like the bills of birds?

Because they are destitute of teeth.

Why do these animals deposit their eggs in the sand?

Because they may there be hatched by the heat of the sun. A single nest has been known to furnish 500 eggs.

Why are the eggs of the land-turtle more likely to be discovered than those of the water-turtle?

Because the former leaves its eggs, one by one, as it hobbles over the ground, neither covering nor taking any care of them whatever, nor paying any regard to the offspring. The water turtle, on the contrary, covers its eggs so accurately as to leave no signs perceptible of its nest; and, however strange it may seem, she so arranges it as to make her tract appear unbroken over the sands, and, after laying her eggs, she proceeds on again in the same direction to complete the deception.

Why is the flesh of the green turtle so well-tasted, and free from oil?

Because it feeds solely on sea-weeds. It is named from the pale olive-green colour of the shell, and the still more remarkably green colour of its fat. This species sometimes weighs 800 weight.

Why is the geometrical tortoise so called?

Because its high-arched shell is *very regularly* marked with black and yellow.

FROGS AND TOADS.

Why have certain frogs been fabulously said to change into fishes?

Because their larva is almost a span long, and then much larger than the perfectly formed animal. The animal also retains its tail for some time after the four legs have acquired their perfect form and size.

Why is the tree frog so called?

Because it climbs trees in search of insects; for

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which purpose it has the extremities of the toes expanded, with suckers beneath.

The clammy slime with which it is covered, like serpents, serves also to support it among the leaves of the trees in which it lives.

Why was it formerly believed to rain frogs?

Because the young of the common frog living in grass, among bushes, &c. come out in vast numbers, after warm summer showers.—*Blumenbach.*

Stories of showers of frogs have, however, obtained credence in our times. Mr. Loudon observes, when at Rouen, in September, 1829, "we were assured by an English family resident there, that during a very heavy thunder shower, accompanied by violent wind, and almost midnight darkness, an innumerable multitude of young frogs fell on and around the house. The roof, the window-sills, and the gravel walks were covered with them. They were very small, but perfectly formed, all dead; and the next day being excessively hot, they were dried up to so many points or pills, about the size of the heads of pins. The most obvious way of accounting for this phenomenon is by supposing the water and frogs of some adjoining ponds to have been taken up by the wind in a sort of whirl or tornado."—*Magazine of Nat. Hist.*

Why does the skin of the frog and toad resemble a bag containing the animal?

Because it does not adhere to the subjacent parts, as in other animals, but is attached to them only at a few points, and is unconnected elsewhere.

According to old Walton, "the mouth of the frog may be opened from the middle of April till August, and then the frog's mouth grows up, and he continues so for at least six months without eating."

Why are toads sometimes found alive inclosed in stones, &c.?

Because the animals have entered a deep crevice of the rock, and becoming torpid, have been covered with sand, which has afterwards concreted around them. Thus removed from the influence of the heat of spring or summer, and in a place where the temperature continued below the point at which they revive, it is impossible to fix limits to the period during which they may remain in this torpid state.

Such is the explanation of this phenomenon, by Dr. Fleming. An ingenious French naturalist, M. Geoffrey St. Hilaire, thinks it gives a very inaccurate idea of the phenomenon, "to assimilate the state of those beings whose lives are preserved in torpidity to the animals benumbed during winter." According to his theory, we must conclude that "there exists, for organization under certain combinations, a state of neutrality intermediate between that of life and death, a state into which certain animals are plunged in consequence of the stoppage of respiration, when it would take place under determinate circumstances.

Why is "star-shot jelly" so often seen floating on ponds, &c.

Because frogs are then spawning, and this consists of the glaire which surrounds the eggs, brought into this state by a frog having been swallowed by a bird, and the warmth and moisture of the stomach having made the jelly and the oviducts expand so much, that the bird is obliged to reject it by vomiting.

CROCODILE, ALLIGATOR, &c.

Why is the crocodile an object of superstitious terror to the Egyptians?

Because of its immense size and destructive powers, it being the largest animal inhabiting fresh water, attaining to full 30, or, as Norden says, 50 feet in length; notwithstanding which, its eggs are scarcely as large as a goose's. When full grown, it attacks men and other large animals. When taken young, it may be tamed. The armour, with which the body is covered, may be considered as one of the most elaborate pieces of natural mechanism. In the full-grown animal it is so strong as easily to repel a musket-ball, appearing as if covered with the most regular and curiously carved work.

Mr. Bullock, late proprietor of a museum in Piccadilly, saw, at New Orleans, "what are believed to be the remains of a stupendous crocodile, and which are likely to prove so, intimating the former existence of a lizard at least 150 feet long; for I measured the right side of the under jaw, which I found to be 21 feet along the curve, and four feet six inches wide."

The teeth of crocodiles have this peculiarity of structure, that in order to facilitate their change, there are always two, of which one is contained in the other.

As a proof of the veneration in which the crocodile was formerly held, we are told by Herodotus, that near Thebes and the Lake Mœris, the natives select one, which they tame, suspending golden ornaments from its ears, and sometimes precious stones of great value; the fore-feet, however, being secured by a chain. They feed it with the flesh of the sacred victims, and with other suitable food; and when it dies it is embalmed, and deposited in a consecrated chest.

Various methods are adopted for catching crocodiles. Labat says, "a negro, armed only with a knife in his right hand, and having his left wrapped round with thick leather, will venture boldly to attack the crocodile in his own element. As soon as he observes his enemy near, the man puts out his left arm, which the animal immediately seizes with his teeth. He then gives it several stabs in the throat, where the skin is very tender; and the water coming in at the mouth thus involuntarily laid open, the creature is soon destroyed." A still more hazardous method was adopted by Mr. Waterton, who travelled in south America about five or six years since. Having secured a crocodile of the Essequibo, by a baited hook fastened to a long rope, by the aid of some Indians, "I pulled the animal," says the traveller, "within two yards of me; I saw he was in a state of fear and perturbation; I instantly sprung up, and *jumped on his back*; turning half round as I vaulted, so that I gained my seat with my face in a right position. I immediately seized his fore legs, and by main force twisted them on his back; thus they served me for a bridle."

On his return home, Mr. Waterton published his Travels; but the *jumping on the crocodile* was received by his readers as a traveller's story, till its possibility was established by reference to Pliny's *Natural History*, where it is stated that the natives of Tentyra mount on the crocodile's back "like horsemen, and as he opens his jaws to bite, with his head turned up, they thrust a club into his mouth, and holding the ends of it, they bring him to shore captive, as if with bridles." Other proofs are quoted in the *Magazine of Natural History*, for 1830.

Why does the alligator differ from the crocodile?

Because the body and tail are more round and smooth than the true crocodile; it is also smaller, and has smaller eggs. Like it, however, it has five toes on the fore feet, and four on the hinder, of which only the three inner ones are provided with claws.

Why do alligators swallow stones when going in search of prey?

Because (as the Indians on the Orinoco assert) they may acquire additional weight to aid them in diving and dragging their victims under water. A traveller being somewhat incredulous on this point, Bolivar, to convince him, shot three alligators with his rifle, and in each of them were found stones varying in weight according to the size of the animal. The largest killed was about 17 feet in length, and had within him a stone weighing about 60 or 70 pounds.

Why is the cayman neither safe on land nor in water?

Because it is driven into the water by the tiger and other enemies; whence it is made to scamper ashore by the porpess, the natural enemy and entire master of the cayman · so much so, indeed, that the natives enter the water without fear when the porpess is in sight.

Why was the crocodile formerly believed to be vanquished by the ichneumon?

Because eggs of crocodiles form the favourite food of the ichneumon, wherefore, this portion of its history became mingled in early times with the above fanciful notion. Divine honours were accordingly awarded to the ichneumon by the ancient Egyptians, and it became, and continued for ages, an object of superstitious reverence to a people prone to this symbolical worship of the powers of nature.

Ichneumons are still domesticated in Egypt, where they rid the houses of the smaller animals, and perform the office of our domestic cat.

Why may the hippopotamus be classed with amphibia? *

Because it runs with astonishing swiftness, for its great bulk, at the bottom of lakes and rivers. At one time it was not uncommon in the Nile, but now is nowhere to be found in that river, except above the cataracts.

The head of a hippopotamus was brought to England about four years since, with all the flesh about it, in a high state of preservation. This animal was harpooned whilst in combat with a crocodile, in a lake in the interior of Africa. The head measures near four feet long, and eight feet in circumference: the jaws open two feet wide, and the cutting-teeth, of which it has four in each jaw, are above a foot long, and four inches in circumference. This formidable creature, when full-grown, measures about 17 feet long from the extremity of the snout to the insertion of the tail, above 16 feet in circumference round the body, and stands above seven feet high. When excited, it puts forth its full strength, which is prodigious. "I have seen," says a mariner, as we find it in Dampier, "one of these animals open its jaws, and seizing a boat between its teeth, at once bite, and sink it to the bottom. I have seen it, on another occasion, place itself under one of our boats, and rising under it, overset it with six men who were in it, but who, however, happily received no other injury."

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* The hippopotamus is, strictly speaking, a quadruped, but its habits being amphibious, entitle it to mention here, especially in connexion with the crocodile, to which it is a ferocious enemy.

Why is a species of lizard called the monitor?

Because it is said to keep in company with the crocodile, and to warn, by its whistling noise, of the proximity of its formidable associate.

Why is another species of lizard called the flying dragon?

Because it flies or takes short leaps from tree to tree, by having, on each side of the body, a membranaceous wing, scarcely connected with the legs. It is supported by the first six false ribs, which instead of being bent round towards the belly, for the protection of the viscera, proceed laterally from the body.

CHAMELEON.

Why does the chameleon change colour?

Because of the circulation of the blood of the reptile, in increased temperature, either of the ambient air or of its own body, producing all the variations of the skin. As the passions of the human mind change the colour of the skin, as well as the form of the features, and according to the rapidity of the flow of blood; so the feelings of the chameleon may also, in some measure, produce analogous changes in the reflecting surface of the skin.—*J. Murray, F. L. S.*

The reflection of coloured objects on the glittering scales of the chameleon, probably gave origin to the fable that its colour is regulated by that of the bodies near which it is placed.—*Notes to Blumenbach.*

Whatever may be the cause, the fact seems to be certain, that the chameleon has an antipathy to things of a black colour. One, which Forbes kept, uniformly avoided a black board which was hung up in the chamber; and, what is most remarkable, when it was forcibly brought before the black board, it trembled violently, and assumed a black colour.

It may be something of the same kind which makes bulls and turkeycocks dislike the colour of scarlet, a fact of which there can be no doubt.—*J. Rennie.*

Why was the chameleon formerly said to feed on air?

Because its lungs are very large, and by expanding them, the animal can, at pleasure, make itself appear large or small.

Why do the eyes of the chameleon differ from those of other amphibia?

Because they can be directed in different ways; for instance, one upwards and the other backwards; and that with great rapidity.

Why may the mechanism of the tongue of the chameleon be compared with that of the woodpecker? *

Because the chameleon's tongue is contained in a sheath at the lower part of the mouth, and has its extremity covered with a glutinous secretion: it admits of being projected to the length of 6 inches, and is used in this manner by the animal in catching its food, which consists of flies, &c. It is darted from the mouth with wonderful celerity and precision, and the secretion on its extremity entangles the small animals which constitute the food of the chameleon.

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*See the *Woodpecker*, page 102.

The form of the chamoleon's tongue is, however, very different from that of the woodpecker.—*Notes to Blumenbach.*

GECKO.

Why is the gecko so dangerous a reptile in houses?

Because it has a poisonous fluid between its scaly toes, which it communicates to the eatables over which it passes. It is common in Egypt, the East Indies, and the South Sea Islands, and even in some parts of Europe, as in the Kingdom of Naples.

Why do some lizards climb perpendicular walls, like the common house-fly?

Because they have suckers on the under side of the toes, the surfaces of which are broad. They consist of transverse pouches, with fringed margins.

THE PROTEUS.

Why has the classification of the proteus animal been so much controverted among naturalists?

Because its characteristics are equally those of a lizard and a fish.

Sir Humphry Davy, in his *Consolations in Travel*, (to which work we have already referred in *Popular Chemistry*), describes this extraordinary animal as "a far greater wonder of nature than any of those which the Baron Valvasa detailed to the Royal Society, a century and a half ago, as belonging to Carniola, with too romantic an air for a philosopher." Sir Humphry saw the proteus in a lake, in the beautiful grotto of Maddalena, at Adelsburg, in Illyria. "At first you might suppose it to be a lizard, but it has the motions of a fish. Its head, and the lower part of its body, and its tail, bear a strong resemblance to those of the eel; but it has no fins; and its curious bronchial (or lung-like) organs are not like the gills of fishes; they form a singular vascular (net-like) structure, almost like a crest round the throat, which may be removed without occasioning the death of the animal, who is likewise iished with lungs. With this double apparatus for plying air to the blood, it can live either below or ve the surface of the water. Its fore-feet resemble ds, but they have only three claws or fingers, and too feeble to be of use in grasping or supporting weight of the animal; the hinder feet have only claws or toes, and in the larger specimens are ıd so imperfect as to be almost obliterated. It has ll points in place of eyes, as if to preserve the ogy of nature. It is of a fleshy whiteness, and sparency in its natural state, but when exposed to t, its skin gradually becomes darker, and at last is an olive tint. Its nasal organs appear large; it is abundantly furnished with teeth, from which ay be concluded, that it is an animal of prey; yet, s confined state, it has never been known to eat, it has been kept alive for many years, by occasion- changing the water in which it was placed."

ir Humphry does not think the proteus is bred in lake in the grotto: "in dry seasons they are seldom ıd here, but after great rains they are often abun- t. I think it cannot be doubted, that their natural dence is an extensive, deep, subterranean lake, ı which, in great floods, they sometimes are forced ugh the crevices of the rocks into this place." We e not space for this great philosopher's theory of proteus; but we may state its conclusion: "the lem of the re-production of the proteus, like that ie common eel, is not yet solved; but ovaria have ı discovered in animals of both species, and in this ance, as in all others belonging to the existing r of things, Harvey's maxim of '*omne vivum ab*' (every animal from an egg) will apply." The ous reader should turn to the "*Consolations*" for Humphry's ingenious speculations on this and y other striking phenomena of nature: indeed, y page of that work is penned in a delightful strain leep-souled philosophy.

SERPENTS.

Why may the ventral, or belly-plates, or scales of serpents, be considered as their feet?

Because these scales slide under each other by a kind of inclusion, so as to permit the ventral surface to shorten or lengthen at the will of the animal. When some of the foremost scales are pressed on the ground, those behind are brought forward, and in their turn supporting the body, enable the forepart to advance. To qualify the scales to do this with greater advantage, they are connected with one another, by means of muscular threads and a longitudinal band, and are likewise aided by the peculiar mechanism of the ribs, which last are connected with the ventral scales by a flexible cartilage. The body, in general, is of a rounded form, but, when preparing for progressive motion, the ribs are drawn so as to flatten the scales of the belly, and by moving anteriorly or posteriorly, give to the scales with which they are connected, a corresponding degree of motion. The ribs in this case act as limbs to the scales, which may be compared to feet. This singular use of the ribs of snakes, in assisting progressive motion, was detected by the acute Tyson, and has been still further illustrated by Sir Everard Home.—*Fleming.*

Sir Everard Home was led to this discovery of the aid afforded by the ribs, to the whole tribe of snakes, in the progressive motion of those animals, by the following circumstances. A snake of unusual size, brought to London to be exhibited, was shown to Sir Joseph Bankes; the animal was lively, and moved along the carpet briskly; while it was doing so, Sir Joseph thought he saw the ribs move forward in succession, like the ribs of a caterpillar. The fact was readily established, and Sir Everard felt the ribs with his fingers, as they were brought forward: when a hand was laid flat under the snake, the ends of the ribs were distinctly felt upon the palm, as the animal passed over it. This was an interesting discovery, as it tended to demonstrate a new species of progressive motion, and one widely different from those already known.—*Notes to Blumenbach.*

Of all animals, serpents possess by far the greatest number of ribs; which amount, in some, to 250 pairs.

Why have snakes a bag between the nose and the eye?

Because they have no glands to supply the skin with moisture from within, but receive it by coming in contact with moist substances: it is possible, therefore, that the bags in the snake may be supplied in that manner, and the more so, as the cuticular lining appears perfect. Another peculiarity is remarkable in snakes so furnished; namely, an oval cavity, situated between the bag and the eye, the opening into which is within the inner angle of the eyelid, and directed towards the cornea, (or transparent membrane to protect the anterior surface of the eye.) In this opening there are two rows of projections, which appear to form an orifice capable of dilatation and contraction. From the situation of these oval cavities, they must be considered as reservoirs for a fluid, which is occasionally to be spread over the cornea; and they may be filled by the falling of the dew, or the moisture shaken from the grass through which the snake passes.—*Sir E. Home.*

Why are scales of different colours?

Because they derive their colours from the mucus web on which they are placed, and this differs in various animals.

The composition of scales, observes Dr. Fleming, is similar to that of the cuticle, with the addition of some earthy salts. They appear to be inserted in that layer of the skin, and to resemble it in many of their properties. When rubbed off, they are easily renewed, and frequently experience the same periodical renovations as the cuticle. In reptiles, scales occur on every part of the body, and are placed laterally in some; whilst in others they are imbricated like the slates of a house. In fishes, the scales are usually imbricated, with the epidermis enveloping their base, and the other edge free. They may also be observed on many insects, exhibiting great varieties of form. What are termed feathers on the wings of butterflies, seem to be a variety of scales.

Why are serpents said to leap?

Because they fold their bodies into several undulations, which they unbend all at once, according as they wish to give more or less velocity to their motion.

The body of some serpents is thrown by the muscles into a very rigid state, when irritated; in which condition it breaks into fragments by the slightest stroke.

Why do many serpents easily swim?

Because they have very long and bladder-like lungs, and the hinder part of the body and tail is much depressed.

Why do some serpents twist their bodies round the branches of trees, or suffer a considerable portion to hang down.

Because, in this attitude, the larger kinds are ready to fall down upon the prey passing beneath, such as deers and antelopes. Such animals are not only retarded by their weight, but incommoded by the foe twisting itself in wreaths round their body, and by contractile efforts crushing it to death.

Why are serpents so speedily extirpated in civilized countries?

Because, not only is man their inveterate personal foe, but he receives powerful support from many of the domestic animals which accompany him in his dispersion over the globe. The hog is not afraid to give battle to the most venomous; and, in general, comes off victorious. The goat likewise readily devours the smaller kinds of serpents, and hence the proverb from the Gaelic, "like the goat eating the serpent,"—importing a querulous temper in the midst of plenty.—*Fleming.*

Why are snakes supposed to fascinate other animals?

Because they may more readily entice and secure them for food. Such is the opinion of Professor Silliman, from his observation of two birds who were enticed, and not pursued, by a large black snake in America. "What this fascinating power is," observes the Professor, "whether it be the look or effluvia, or the singing by the vibration of the tail of the snake, or any thing else, I will not attempt to determine—possibly this power may be owing to different causes in different kinds of snakes.

Dr. Hancock, in a recent contribution to *Jameson's Journal*, however, combats this opinion of the *fascination* of serpents, by saying, "it is not a faculty of charming or of fascinating, in the usual acceptation of the term, which enables certain serpents to take birds; but, on the contrary, the hideous forms and gestures, which strike the timid animals with impressions of horror, stupefying them with terror, and rendering them unfit for any exertion; especially as those serpents to which has been ascribed the power of fascinating, are among the most terrific of the tribe.

Why are dragons represented in fable with ringed bodies?

Because they originated in the *ringed* snake, which, even in Europe, has been found ten feet in length and upwards. Its colour is steel-gray, wherefore the dragon is often so coloured.

Why are venomous serpents distinguishable from those which are not so?

Because of the poison-teeth, which are placed on the anterior edge of the upper jaw, with the corresponding increase in the size of the latter; while, in the harmless serpents, the whole of the outer edge of the upper jaw is furnished with teeth, even to the very back part.—*From the German.*

Among the other characters of distinction, are the broader and heart-shaped head of the venomous, with small flat scales, instead of a single plate; the tail-shaped ridge on the back; and the shorter tail, which measures less than one-fifth of the animal.—*Dr. Gray, in Philos. Transac.*

The number of known venomous species, compared to those which are not so, is reckoned as one to six.

Why are the fangs of some serpents called poison fangs?

Because they contain a tubular cavity from their base (where is the poison bag) passing through a tooth on its convex side, to the apex, where it ends in a narrow slit. When the serpent bites an animal, the poison flows from the bag through this slit, into the bottom of the wound, where to most advantage it can produce its deleterious effects. The properties of the poison continue even after it has been dried. If instilled into the wound, in any quantity, and it enters any of the larger vessels, death speedily follows. The virulence of the poison depends not only on the species of serpent, but on its condition at the time, and the habit of body of the animal which has received the bite.

Why is the cobra di capello also called the hooded snake?

Because, when irritated, the skin on the neck is expanded and drawn forwards, and appears behind the head as a kind of hood. This motion is produced by the cuticular muscles of the neck, aided by the movable ribs.

Why do the snake-catchers of India handle with impunity the most venomous serpents?

Because they rub their hands, previously to taking hold of the snake, with an antidote composed of pounded herbs, the virtue of which is such, that they hold with the naked hand, and provoke fearlessly, the deadly cobra di capello. The secret is not unknown in China; and the cobra, in common with other serpents of a similar nature, are often exhibited in Canton.

Why are vipers distinguished from snakes?

Because vipers bring forth their young alive, whereas, snakes hatch their young from eggs, in dunghills, &c.

THE RATTLESNAKE.

Why is the rattle-snake so called?

Because it has a series of cups appended to its tail; which cups, when the serpent moves its body, likewise move one upon another, and make a rattling noise, not unlike the folding of dried parchment. This noise is said to be audible at the distance of twenty yards, and is thus useful in giving warning of the approach of the destructive reptile, to which it is attached. Its bite is attended with frightful consequences, as in the following instance:—"An emigrant family inadvertently fixed their cabin on the shelving declivity of a ledge, that proved a den of rattle-snakes. Warmed by the fire on the hearth of the cabin, the terrible reptiles entered in numbers, and, of course, in rage, by night, into the room where the whole family slept. As happens in those cases, some slept on the floor, and some in beds. The reptiles spread in every part of the room, and mounted on every bed. Children were stung in the arms of their parents, and in each other's arms. Most of the family were bitten to death; and those who escaped, finding the whole cabin occupied by these horrid tenants, hissing and shaking their rattles, fled from the house by beating off the covering of the roof, and escaping in that direction."—*Flint's Geography and History of the United States.*

Dr. Mead supposes this rattle may serve to bring birds, &c., within the reach of the snakes, from the effect its sound produces. Major Gardner, who had lived long in East Florida, affirms, that the young Indians of that country, were accustomed to imitate the noise of the rattle-snake, for the purpose of taking squirrels, &c.

Blumenbach says, "we are assured, by credible eye-witnesses, that squirrels, small birds, &c. fall from the trees on which they stand, into the throat of the rattle-snake below; the circumstance is not, however, by any means confined to this genus, as it has been remarked in many other serpents of both the Old and the New World. Rattle-snakes are eaten by hogs and birds of prey. They may also be tamed, and rendered docile."

Why is the rattle-snake inaudible in the wet season?

Because, as the cups of the rattle consist merely of dried matter, which, in the dry season, is brought into a condition to make a noise when the animal moves, so, in like manner, the rattle, in the wet season, is soft and mute.

THE SEA-SERPENT.

Why is the existence of the American sea-serpent no longer credited?

Because of the following exposure of its fraud, as related by Professor Silliman.

The first sea-serpent was a steam-boat, which, being established at Boston to coast along the shore, and from its powers and capabilities competent to injure the business of small boats, was described as a sea-serpent that had been seen off Nahant and Gloucester, and had probably come there to consume all the small fish in the place. This was received by many as a serious account, and believed accordingly.—Another sea-serpent history arose from the circumstance, that a small sloop, called the Sea-serpent, having been passed by another vessel, the captain of the latter, when asked, upon his arrival at home, for news, said he had seen a sea-serpent, and then described its bunches on the back, the action of its tail, and other parts; all of which being understood literally, actually appeared in print, as evidence for the existence of the animal.

Then a piece of the skin of the bony scaled pike was taken for part of a sea-serpent's hide. And from such occurrences as these, perhaps, mingled with careless observation of the motions and appearances of porpuses, basking sharks, and balænopterous whales, appear to have originated every thing that has been said about American sea-serpents.

Dr. Fleming thinks it "probable, that many of those stories which have been propagated, regarding *vast sea-snakes*, have originated in the appearance of some of the larger serpents at sea, where they have been driven by accident. Some of the Asiatic species reside almost constantly in the water, either fresh or salt."

In 1827, Dr. Harwood presented to the Royal Society an account of a new serpentiform sea animal, which he named the *ophiognathus*. The specimen is 4 feet 6 inches in length, and the jaws open wider than those of any other animal that the Doctor is acquainted with; not excepting even the rattle-snake. Its entire form indicates that it must possess great swiftness of motion in the waters.

FISHES.

GENERAL ECONOMY.

Why does swimming resemble flying?

Because the organs which are employed for both purposes, resemble the oars of a boat in their mode of action; and, in general, possess a considerable extent of surface and freedom of motion. The former condition enables them to strike the surrounding fluid with an oar of sufficient breadth, to give progressive motion to the body; and the latter permits the same organ to be brought back to its former position for giving a second stroke, but in a different direction, and without offering so great a resistance. The centre of gravity is so placed, that the body, when in action, shall rest on the oars or swimmers, or be brought by certain means to be of the same specific gravity with the water.

Why do fish swim?

Because they have fins, which balance and keep them level; and tails, which act against the water, and direct them like rudders.

The form of the body in fishes, is infinitely more varied than in reptiles or serpents. In most, however the body has a vertical direction, *i. e.* flattened at both sides; in some, on the contrary, as the rays, it is horizontal, and extended laterally; in others, as the eel, &c., it is more rounded; in some prismatic, or quadrangular. In all, the head and trunk are connected immediately, without being separated by a neck.—*Blumenbach.*

Why are the fisheries of Britain so important a portion of her resources?

Because her limited soil, contrasted with extensive sea-coasts, and numerous rivers and lakes, intimate to her population, the expediency of obtaining a large portion of their sustenance from the waters. These are known to teem with life, and to furnish a supply of agreeable and nourishing food, which may be pronounced inexhaustible.

Savage nations, as the Kamschatkadales, Brazilians, &c. possess the art of preparing fish in a great variety of ways, even as a kind of flour, bread, &c. With many, as the Islanders of the Pacific Ocean, fishing forms a principal occupation, and a serious kind of study with reference to the ingenious methods and instruments which they have invented. To a great part of the cultivated world, the taking of the herring, cod, tunny, &c. is of still greater value. The oil of the shark, cod, and herring, is used for burning in lamps, &c. The inhabitants of the eastern coast of the middle of Asia, clothe themselves with the tanned skin of the salmon. Many parts of other fish are employed for the purposes of art, as the scales of the bleak, for making false pearls. Shagreen is made from the skins of sharks and rays.

Why do fishes die almost immediately in the air?

Because asphyxia (or suspension of pulsation) is occasioned by the sinking of the branchiæ, or gills, no longer supported by the interposition of water between their laminæ (or layers); and this idea has been confirmed in prolonging the life of fishes, by artificially keeping the laminæ in the state of separation which the water produces. On the other hand, by compressing the branchiæ under water, similarly to their condition in the air, death occurred as quickly as in the latter fluid.

Water may act on the respiration of fishes chemically, physically, or mechanically. The latter influence has, however, been but imperfectly attended to. In 1830, M. Fleurens, with the view that water exercises only a mechanical action on their respiration, put several fish into wine. They did not live as in water, but their death was much longer delayed than in air. He explained this action of the wine, by remarking that this liquid contains much less air than water.

Why do fishes, when dead, float on the surface of the water, with the belly uppermost?

Because the body being no longer balanced by the fins of the belly, the broad muscu ar back preponderates by its own gravity, and turns the belly uppermost, as lighter, from its being a cavity, and because it contains the swimming bladders, which continue to render it buoyant.—*White's Natural History of Selborne.*

Why have not fishes any voice?

Because they have not lungs.

Although fishes possess no voice by which they can communicate their sensations to others, some species utter sounds when raised above the water, by expelling the air through the gill-opening when the flap is nearly closed: while others, even under water, as the salmon, utter certain sounds while depositing their spawn; but for what purpose these sounds are uttered, or by what organs they are produced, we are still ignorant. —*Fleming.*

A writer in the *Magazine of Natural History* tells us, that some tench which he caught in ponds, made a croaking like a frog for full half an hour, whilst in the basket at his shoulder.

Why are fishes said to have "true" fins and gills?

Because these organs may be distinguished from others to a certain degree analogous in young frogs, &c. The gills are filled with innumerable very delicate vessels, and are mostly divided on each side into four layers, which somewhat resemble the beard of a quill, and which are attached at their basis to a corresponding number of little bones.—*Blumenbach.*

Why are these fins essential to swimming?

Because they consist of jointed rays, covered by the common integuments: these rays serve to support the fishes, and approach or separate like the sticks of a fan, and move upon some more solid body as a fulcrum. Thus, in sharks, the rays of the fins behind the gill are connected by a cartilage to the spine.

The motions of fish are indeed performed by means of their fins. The caudal, or tail fin, is the principal organ of progressive motion; by means of its various flexures and extensions, it strikes the water in different directions, but all having a tendency to push the fish forward; the action resembling, in its manner and effects, the well known operation of the sailor termed skulling. The ventral and pectoral fins assist the fish in correcting the errors of its progressive motions, and in maintaining the body steady in its position. Borelli cut off, with a pair of scissors, both the pectoral and ventral fins of fishes, and found, in consequence, that all the motions were unsteady, and that they reeled from right to left, and up and down, in a very irregular manner.

Why are the fins of fishes important to the naturalist?

Because the characters furnished by their position, are employed as the basis of his classification. Thus, by Linnæus and others, the ventral or belly fins, are considered as analogous to the feet of quadrupeds, &c.

Why do medusæ swim, although they have no fins, or oars?

Because they vary the form of the body by alternate contractile and expansive movements.

We may here observe, that the motions in water caused by sea animals of various descriptions, were noticed at an early period by observers, but it is only of late years that they have engaged the particular attention of zoologists.

Why have fishes such extraordinary number and bulk of muscles?

Because they may support that great expenditure and exertion, which is a necessary consequence of the peculiar abode, and whole economy of these animals. —*Blumenbach.*

Why have fishes gills?

Because they are calculated to separate air from water, with which it is always united, and bring it into contact with the blood. It is to be observed, however, that many animals which reside in the water, breathe by means of lungs, and are obliged, at intervals, to come to the surface to respire, such as whales; but there are no animals which reside on the land, and are furnished with gills, which are obliged to return to the water to respire.—*Fleming.*

Why do those fishes, in which the gill openings are but imperfectly covered, expire soonest when taken from the water?

Because the air soon dries the fine plumes of the gills, and obstructs the process of respiration and circulation.

Why does respiration by gills differ from that by lungs?

Because the former, as in fishes, introduces the air, which the water holds in solution, through the mouth into the gills, and then expels it again through the branchial aperture; consequently, not by inspiring and expiring through the same passage, as in those animals which possess lungs.—*Blumenbach.*

Why do some fishermen cut the gills with a knife, as soon as the fish is taken?

Because an injury received by the gills of fishes is attended by a considerable effusion of blood; and a fish so killed, will keep much longer in a fresh state, than one on which this operation of bleeding has not been performed.

Why is the surface of the skin of fishes almost always covered with slimy fluid?

Because it may protect them from the penetrating influence of the surrounding element.

The pores from which this viscous matter is secreted, are frequently visible to the eye in fishes: they are connected with vessels which traverse the body under the skin, and contain the fluid.—*Fleming.*

Why are the scales, or rather hard coverings, of such protection to reptiles and fishes?

Because these parts possess neither vessels nor nerves; and, therefore, the whole superficies of the animal's body is insensible, and constitutes a dead medium, through which impressions are conveyed to the subjacent living parts.—*Blumenbach.*

Why do the scales of fishes differ from hair and feathers?

Because scales are not changed, but are perennial; and are said to receive yearly an additional layer, from the number of which the age of the animal may consequently be determined. The scales of sea-water fish are bare, but those on coasts or in fresh water are covered with a mucous or slimy membrane.

In examing these different appendices of the skin, we perceive that they pass, by insensible degrees, into one another, as hair into spines, horns into nails, scales into shells, and crusts into membranes. They have all one common origin, namely, the skin; and, independent of secondary purposes, they all serve for protection.—*Fleming.*

Why is the gullet remarkably short in fishes?

Because they have no neck. In some, indeed, the stomach seems to open directly into the mouth. The gullet is, however, capable of great extension, and when the stomach is unable to hold the whole of the prey, which has been seized, a part remains in the gullet until the inferior portion gives way.—*Fleming.*

Why is the air-bag or sound considered an article of value?

Because this organ in the cod or ling, when salted, forms nourishing and palatable food. But it is chiefly in the manufacture of isinglass, that the sounds of fishes are extensively employed. Sturgeon sounds are chiefly used for this purpose.

When in a sound state, the external skin of the air-bag (regarded as possessing strong muscular power) is supposed capable of contraction, so as to condense the air, and enable the animal to sink; or of extension, so as to allow the air to expand, and aid the animal in rising in the water.

Why is isinglass so nutritious?

Because it consists almost entirely of gelatine.

Why is the air-bladder thought to be unconnected with the respiration of fishes?

Because this bladder does not exist in many fishes.

Why is the air-bladder believed to be subservient to the motion of fishes?

Because it is largest in such fishes as swim with considerable velocity.

Why have flat fish large lateral fins?

Because they have no air-bladder to enable them to swim. In the shark the absence of the air-bladder is compensated by the size and strength of the tail.

Why does the lamprey creep slowly at the bottom of the water?

Because it has neither air-bladder nor fins to enable it to swim.

Why is the osteology of fishes but little attended to by naturalists?

Because the skeleton is more complicated than that of man, and is difficult to prepare and preserve.—*Fleming.*

The bones of fishes, when reduced to powder, are mixed up with farinaceous substances, and used instead of bread, by some of the northern nations.

Why do fishes leap?

Because of a violent effort of the caudal fin; or, according to some, by bending the body strongly, and afterwards unbending it with an elastic spring.

Why are certain fish enabled to fly?

Because they have the air-bag of uncommonly large dimensions, wherefore the body has great buoyancy. The pectoral fins are likewise large, and having, by a leap raised themselves above the surface of the water, they continue in the air and move forwards, seldom farther than a hundred yards, by the action of these fins.

Why cannot these fish take long flights?

Because the membrane of their fins soon becomes dry, when they again fall into the water. The flying fish generally leave the water to escape from other fish which prey upon them.

There is also a species of fish which is capable of *climbing*, and has been known to raise itself five feet above the surface of the water, and mount up the crevices of trees, by means of its various spines.

Why have some fish a sucker?

Because, it is supposed, by its means the fish attaches itself to the sides of other fishes, or to the bottoms of ships, when it is carried forward without any exertion of its own; and, during storms, adhesion to rocks may save a weak fish from being tossed about by the fury of the waves: other purposes, probably, remain to be discovered.

About five years since, a correspondent of the *Quarterly Journal of Science*, drew up, in Dublin harbour, a whiting pollack, under whose throat a sea-lamprey had buried its head, and thus firmly attached itself. When separated, the lamprey darted on its prey, to which it again adhered firmly.

Why is the eye one of the most important organs which fishes are known to possess?

Because it enables them to perceive the approach of their foes, and it is the principal instrument by which they obtain their food. The amateur in fly-fishing often tempts the fish with one kind of fly, but in vain; and, upon substituting another in its place, of a different form or colour, succeeds in the capture. These motions of fish are all regulated by the eye: hence some fish will bite as readily at a bit of red cloth as at a piece of flesh.—*Fleming.*

The eyes of fishes are larger in proportion to the size of their bodies, than in quadrupeds, as we find the eye of the cod-fish equal in size to that of an ox.

Why have the ray and shark such extraordinary strength of sight?

Because the eye rests on a thin cartilaginous pulley, which is attached to the bottom of the orbit, and thus increases its motions. In other fishes, the motions of the eye are confined.

Why do not fish sleep?

Because they have no eye-lids, nor any membrane to close and cover their eyes, as animals that sleep have.

Why is the internal ear of fishes distinguished from that of the other three classes of red-blooded animals?

Because it grows as the fish increases in size, and consequently its magnitude is in the direct ratio of the bulk and age of the animal.

Why are fishes supposed to possess a feeling analogous to the sense of touch?

Because most of them feel acutely on the abdomen, and in the lips. It is doubtful whether their tongue be an organ of taste, and in what degree it may serve that purpose.—*Blumenbach.*

Why is the reproduction of fishes so enormous?

Because, probably, a great number of species live in succession on each other, according to their strength and voracity.

The following may convey some idea of the prolific powers of fish:—

		Eggs.
Carp	produces	203,109
Cod-fish		3686,760
Flounder		1357,400
Herring		36,960
Mackerel		546,681
Perch		28,323
Pike		49,304
Roach		81,586
Smelt		38,278
Sole		100,362
Tench		383,252

The rays and sharks seem to produce but a very limited number. The utmost, stated by different observers, is 26 and 30. It should be added, that there is no estimated proportion between the number of eggs deposited, and the number of fish which arrive at maturity. The eggs are eagerly sought after by other fishes, by aquatic birds, and reptiles; and in the young state, they are pursued by their own species, as well as by beings belonging to other classes.

Why do fishes materially increase in size, previous to the approach of the spawning season?

Because they may be the better enabled to undergo the fatigues and fastings by which spawning is accompanied. The muscles then acquire size and strength, especially those connected with the tail, the principal organ of progressive motion, so that the body behind appears plump and round. A great deal of fat is deposited between the muscles, but especially on the belly, the flesh of which is, at this time, of considerable thickness.

Why does this fatness decrease, as the spawn advances to maturity?

Because the fat is withdrawn for its nourishment; the belly becomes little else than skin, and while the deluded epicure, upon seeing the large roe, imagines that his fish is in the best condition, it has actually reached the very maximum of worthlessness. When the business of spawning is over, the leanness of the fish then becomes apparent, and the extraordinary muscular exertion which it has undergone, is marked by the leanness of its head and the lankness of its tail.

Why do fishes deposit the spawn towards the margin of a river, &c.?

Because in the shallow water the numerous small animals reside, which constitute the most suitable food for the tender fry.

Again, the cod and haddock, the mackerel and herring, annually leave the deeper and less accessible parts of the ocean, the region of the zoophytic tribe, and deposit their spawn within that zone of marine vegetation which fringes our coasts, extending from near the high-water mark of neap-tides, to a short distance beyond the low-water mark of spring-tides. Amidst the shelter in this region, afforded by the groves of arborescent fuci, the young fish were wont, in comfort, to spend their infancy; but since these plants have been so frequently cut down to procure materials for the manufacture of kelp, and the requisite protection withdrawn, the fisheries have suffered in consequence.

Why are fishes caught by baits?

Because they are deceived by analogy, considering the identity as perfect, when there are only a few points of resemblance.—*Fleming.*

We may observe, that the well-known voraciousness of fishes, the eagerness with which they seize a metal button, or any glittering object—the whole art of artificial bait and fly-fishing, all seem to point out the organ of sight, as the principal instrument by which they discover their food.

Why do anglers maintain that fly-fishing is not a species of cruelty?

Because the hook is usually fixed in the cartilaginous part of the mouth, where there are no nerves; and a proof that the sufferings of a hooked fish cannot be great, is found in the circumstance, that though a trout has been hooked and played for some minutes, he will often, after his escape with the artificial fly in his mouth, take the natural fly, and feed as if nothing had happened; having, apparently, learnt from the experiment, that the artificial fly is not the proper food. Pikes have been caught with four or five hooks in their mouths—and tackle which they had broken only a few minutes before.—*Sir H. Davy, in "Salmonia, or Days on Fly-fishing."*

Why are anglers recommended to fish early and late in the summer months?

Because, generally, fish do not then feed in the middle of the day, unless the weather be very dark and gloomy—during drizzling rain—or a light breeze of wind.

Why are fishes considered nocturnal animals?

Because they are active during the night, and in the day remain in a state of repose. Hence the inhabitants of islands and coasts, who live on fish, choose the night for catching them.—*Blumenbach.*

Why are some fishes said to be amphibious?

Because they are capable of living either in fresh or salt water at pleasure. Such fish, in an economical point of view, are extremely valuable, as they furnish to the inhabitants of this and other countries, an immense supply of food. The salmon is an instance in Scotland, where from one river, (Tay) 50,000 head of full-sized fish have been procured in one season. To the Greenlanders, their salmon is, perhaps, more valuable; as it is dried hard, then broken and pounded, and formed into bread,—as well as consumed in a fresh or salted state.

Why are fishes generally supposed to attain a great age?

Because the element in which they reside, preserves them from the pernicious influence of sudden changes of temperature: the process of ossification, (or growth of bones) is very slow in them; their blood is very cold—and their primary movements tardy. Accordingly, we find the age of the carp has been known to reach 200 years, and the pike to 260. "The marks, however, by which the age of fishes may be determined, remain to be discovered."—*Fleming.*

Why does a fish but seldom die a natural death from old age?

Because, during every period of its existence, it is surrounded by foes; and when no longer able to exercise its wonted watchfulness, or exert its power of defence, it falls an easy prey to its more powerful adversaries.

Why are not fishes found in all rivers in mountains?

Because they appear to prefer certain altitudes. Thus, in ascending mountains, we may observe, that the fish in the lakes and rivers have their boundaries, as well as the vegetables which cover their surface. Wahlenberg found that the pike and perch disappeared from the rivers of the Lapland Alps, along with spruce fir, and when 3,200 feet below the line of perpetual snow. Ascending 200 feet higher, the gwiniad and the grayling, were no longer to be found in the lakes. Higher up still, or about 2,000 feet below the line of perpetual snow, the char had disappeared; and beyond this boundary, all fishing ceased.

Why is fish oil (of the sprat, pilchard, &c.) very liable to become fœtid?

Because, in general, the oil is obtained from the livers of the fish, in which it is lodged in cells; but, as it cannot be procured completely from livers by mere boiling, they are allowed to become a little putrid, that the oil may be more readily extracted, by the rupturing of the cells. Along with the oil various other impurities are obtained, as bile, gelatinous matter, &c.

Why have so many absurd stories been told of showers of fishes?

Because it sometimes happens that vivacious fishes, or those capable of surviving a long time out of water, are conveyed to a distance by birds, and left without being killed, on rocks or fields.—*Fleming.*

Why are some kinds of fish poisonous?

Because of the quality of the food on which they have subsisted. This is only conjecture, but is supported by the history of the mussel and the oyster, which owe their occasional noxious qualities to the zoophytes on which they feed.

The poisonous qualities of some shell-fish are, however, attributed by writers on their dietetic properties, to other causes, as we have already shown.*

Why are sea fish sometimes found in fresh water?

Because, in forsaking the deep water, and approaching a suitable spawning station, they leave the sea altogether for a time, ascend the rivers and their tributary streams, and having deposited their eggs, return again to their usual haunts. Even certain species of fish, inhabiting lakes, as the roach, betake themselves to the tributary streams, as the most suitable places for spawning.

Why, in stocking fish-ponds, should the transportation of fish take place only in winter?

Because fish can bear cold much better than heat.

Why are fish, as an article of food, well suited for the young, the weak, and the sedentary?

Because it is light, and easily digested; but, for the same reason, it is unsuitable food for those engaged in laborious occupations.

Why is it difficult to preserve fish in glass jars, or small ponds?

Because a great deal of the oxygen in the air contained in the water, is necessarily consumed by the germination and growth of the aquatic plants, and the respiration of the infusory animalculæ. In all cases, when the air of the atmosphere, or that which the water contains, is impregnated with noxious particles, many individuals of a particular species, living in the same district, suffer at the same time.

Why do fishes perish in water that has been boiled?

Because the water is then deprived of its atmospheric air, by means of which fishes carry on their respiration.

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* See DOMESTIC SCIENCE, page 45.

Why, when fish are steeped in water, does the whole fluid become luminous?

Because the luminousness appears to be caused by the infusory animalculæ, with which water abounds. —*Canton, Phil. Trans.*

Why are fish said to be "in season"?

Because the milt and roe are then ripening. After the fish have deposited the spawn, the flesh becomes soft, and loses much of its peculiar flavour. This is owing to the disappearance of the oil or fat from the flesh, it having been expended in the function of reproduction.

When in season, the thick muscular part of the backs, as it contains the smallest quantity of oil, is inferior in flavour or richness, to the thinner parts about the belly, which are esteemed by epicures, as the most savoury morsels.

Why is the reproduction of fishes involved in great obscurity?

Because the element in which they reside conceals from us the actions which they perform, so that we are unable to point out, with certainty, the uses of the different organs, or the functions which they exercise. Even in the days of Aristotle, the difference in the mode of reproduction between the cartilaginous and the osseous fishes had been observed; and although many accurate observations have been made by modern zootomists, much still remains to be done, both in the field of observation and dissection.

In reference to the reproductive system, fishes may be divided into two classes. Thus, some have the sexes distinct, while in others they are united.—*Fleming.*

RAY-FISH.

Why do the ray genus appear to have contributed to the fable of Sirens?

Because of a certain similarity of the lower part of their head to the human face. Many species have also been dried, and metamorphosed by a variety of artifices, into supposed basilisks, &c. Although they lay but one egg at a time, they increase so rapidly, that the ocean, in some spots, actually swarms with them. Their eggs have a horny covering with four points, and are called sea-mice.—*Blumenbach.*

Why is the liver of the skate, cod, and some other fishes, remarkably oily?

Because the rest of their bodies is almost destitute of fat.

Dr. Monro, calculated that the whole gills of a large skate, presented a surface equal to 2,250 square inches; or equal to the whole external surface of the human body.

SHARKS.

Why have most of the sharks very numerous teeth?

Because they may supply such as may be lost. The white shark has more than 200, lying on each other in rows, almost like the leaves of an artichoke. Those only, which form the front row, have a perpendicular direction, and are completely uncovered. Those of the subsequent rows are, on the contrary, smaller; have their points turned backwards, and are covered with a kind of gum. These come through the covering substance, and pass forward when any of the front row are lost. The teeth are at first soft and cartilaginous, but gradually become hard as ivory.

The white shark weighs as much as 10,000 pounds, and even whole horses have been found in its stomach. —*Blumenbach.*

Voracious as are the habits of sharks, the South Sea islanders are not in the least afraid of them. Portlock, the navigator, says: "I have seen five or six large sharks swimming about the ship, where there have been upwards of 100 Indians in the water: they seemed quite indifferent to them, and the sharks never offered to make an attack on any of these people, and yet at the same time, they would greedily swallow our baits." The perseverance with which sharks follow a vessel at sea, containing a dead body, would prove their nasal organs to be very acute. In a recent voyage from Bombay to the Persian Gulf, the smell of a dead body of an Arab sailor of a crew, attracted several sharks round the ship, one of which, eight feet in length, was harpooned and hauled on board.

As a curious fact connected with the natural history of the Bible, we may mention that, in 1828, the Rev. Dr. Scot, of Corstorphine, read before the Wernerian Society, a paper on the great fish that swallowed up Jonah, showing, that it could not be *a whale*, as often supposed, but was, probably, *a white shark*. We may observe, that the *whale* is a gratuitous identity, since the text is " a great fish."—(*Jonah*, *c.* ii. *v.* 7.)

Why is the hammer-headed shark also called the balance fish.

Because it has a long obtuse head with eyes fixed at the extremities, and its mouth in the centre. Unlike other sharks, the above is more remarkable for its structure than size, it being little more than 6 feet in length.

Why is the pilot-fish so called?

Because it is always found accompanying or preceding the formidable shark.

Why is the saw-fish so called?

Because it has a broad, sword-like weapon in front of the head, with twenty-four or more teeth inserted into its lateral edges.

Why is the sturgeon said to have given rise to the fabulous tales of monstrous sea-serpents of the North?

Because it often happens that many of them follow in a row one after another. The sturgeon is an important fish—as well for its flesh, as for the caviare prepared from its roe. It sometimes weighs nearly 1,000 pounds.—*Blumenbach.*

Why is the sun-fish so called?

Because of the phosphorescent light of the sides and belly of the living fish. It weighs, occasionally, as much as five cwt.

Why was the sucking-fish formerly believed able to stop a ship in full sail?

Because it can attach itself most firmly, by means of the grooves on the back part of its head, to ships, sharks, &c.

Why is a certain fish called the sea-horse?

Because of the resemblance of its front part to a horse's head and neck. In dying, it bends itself like an S; and then resembles the knight, at chess.

Why is the sea-dragon so called?

Because it has large and wide pectoral fins, which resemble expanded wings.

EELS.

Why has the economy of the eel so long exercised the ingenuity of naturalists?

Because they have hitherto been unable to establish their mode of generation. Lacepède, the French naturalist, asserts, in the most unqualified way, that they are viviparous; but, says Sir H. Davy, "we do not remember any facts brought forward on the subject." Blumenbach says—"According to the most correct observations, the eel is certainly viviparous;" for which he quotes Voight's *Neues Magazine.* Sir Everard Home, by a course of patient investigation, has ascertained that the common and conger eels, as well as lampreys, are hermaphrodites.

Why do young eels seek fresh water?

Because they prefer warmth, and swimming at the surface in the early summer, find the lighter water warmer, and likewise containing more insects, and so pursue courses of fresh water,—as the waters from the land, at this season, become warmer than those from the sea.

Sir H. Davy, in his *Salmonia*, has some interesting observations on this curious subject:—"Thus, it is certain, that there are two migrations of eels—one up and one down rivers, one *from* and the other *to* the sea; the first in spring and summer, the second in autumn, or early in winter. The first of very small eels, which are sometimes not more than two or two and a half inches long; the second of large eels, which sometimes are three or four feet long, and which weigh from 10 to 15, or even 20 lbs. There is great reason to believe, that all eels found in fresh water, are the results of the first migration; they appear in millions in April and May, and sometimes continue to rise as late even as July, and the beginning of August. I remember this was the case in Ireland in 1823. It had been a cold, backward summer; and when I was at Ballyshannon, about the end of July, the mouth of the river, which had been in flood all this month, under the fall, was blackened by millions of little eels, about as long as the finger, which were constantly urging their way up the moist rocks by the side of the fall. Thousands died; but, their bodies remaining moist, served as the ladder for others to make their way; and I saw some ascending even perpendicular stones, making their road through wet moss, or adhering to some eels that had died in the attempt.—Mr. J. Couch, in the *Linnæan Transactions*, says, the little eels, according to his observation, are produced within reach of the tide, and climb round falls to reach fresh water from the sea. I have sometimes seen them in spring, swimming in immense shoals in the Atlantic, in Mount Bay, making their way to small brooks and rivers. When the cold water from the autumnal flood begins to swell the rivers, this fish tries to return to the sea; but numbers of the smaller ones hide themselves during the winter in the mud, and many of them form, as it were, masses together. Dr. Plot, in his *History of Staffordshire*, says: "eels pass in the night across meadows, from one pond to another;" and Mr. Anderson, in the *Philosophical Transactions*, distinctly states, that small eels have risen up the flood-gates and posts of the water-works of Norwich; and then made their way to the water above, though the boards were smooth-planed, and 5 or 6 feet perpendicular. He says, when they first rose out of the water upon the dry board, they rested a little, which seemed to be till their slime was thrown out, and sufficiently glutinous; and then they rose up the perpendicular ascent, with the same facility, as if they had been moving on a plane surface. There can, I think, be no doubt that they are assisted by their small scales, which, placed like those of serpents, must facilitate their progressive motion; these scales have been microscopically observed by Leuwenhoeck."

Why is it probable that common eels are often confounded with the conger?

Because, as very large eels, after having migrated, never return to the river again, they must, (for it cannot be supposed that they all die immediately in the sea) remain in salt water. The conger eel, it may be added, is found from a few ounces to 100 lb. in weight.

Why is the eel destitute of ventral or belly fins?

Because its form is so entirely equal as to require little balance either one way or the other; the use of the ven ral fins being to balance the fish in the water.

Why may an eel be skinned without producing any hole in the situation of the eye?

Because the skin in this and the greater number of fishes, passes directly over the eye without forming any fold; and in the above case it does not adhere very closely to the eye; the skin only exhibiting at that place a round transparent spot.

Why are some fishes blind?

Because of the uniform opacity of the skin in passing over the eye.

Why does the skin of the eel turn white when plunged into boiling water?

Because of the coagulation of the albumen in which the skin is enveloped.

ELECTRICAL FISH.

Why is not a benumbing sensation always felt when these fish are touched?

Because the animal appears only to excite it when irritated or otherwise disturbed. Then the fish is observed to twist its body, as if about to make a vigorous muscular exertion; and a benumbing sensation is instantly felt in the fingers, and even as far as the elbows. The fish is capable of making this benumbing effort many times in succession in the water, as well as in the air, when arrived at maturity, and even previous to the natural period of exclusion from the uterus of the mother. When caught in the net, it gives a shock to the hands of the incautious fisherman, who ventures to seize it. When concealed in the mud, it is capable of making its most violent efforts; and is able to benumb the limbs to such a degree, as to throw down the passenger who inadvertently places his foot upon the body.

We have already noticed the electrical organs of fishes in connexion with the Voltaic apparatus.* Their *structure* should be more specially mentioned here, although, to explain this fully would occupy more space than we can devote to the subject, great as is its naturo-philosophical interest.—The organs of the *torpedo* (of the ray tribe) are double, and occur in the fore part of the body, one on each side of the cranium, and extend back as far as the gill-openings, occupying the whole skin between the upper and under surfaces.

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* See POPULAR CHEMISTRY, pp. 46 and 47, Part V

In the *gymnotus electricus*, (or electric eel) the organs occupy scarcely one half of the body of the animal, being two on each side, and extending along the sides and belly, from the head to near the tail. In the *silurus electricus*, found in African rivers, the structure of the organ is more simple than in the torpedo or gymnotus. It consists of a bed of very fine meshes, which cross each other in every direction, the whole being covered by a membrane, which is itself covered with a layer of fat. The nerves with which the organ is provided, proceed from the eighth pair; but are not so large in proportion as in the torpedo.—*Abridged from Fleming's Philosophy of Zoology*, vol. i.

THE DORY.

Why is the fish dorée so called?

Because, while living, the colour is very resplendent, and as if *d'orée*, or gilt; but Sir Joseph Banks used to say it should be *adorée*, and that it was the most valuable of fish because it required no sauce.

Why is the John Dory in Venice called the Janitore, or the gate-keeper?

Because St. Peter is most commonly designated, among the Catholics, as being the reputed keeper of the keys of heaven; and out of the mouth of this fish they believe the Apostle took the tribute money.

Why do some Catholics believe the John Dory to be the fish out of whose mouth St. Peter took the tribute money?

Because the breast of the fish is very much flattened, as if it had been compressed; but, unfortunately for the credit of the monks, this feature is exhibited by at least twenty other varieties of fish.

THE PERCH, ETC.

Why is the perch better armed against the attacks of its enemies than most fresh-water fishes?

Because its spines, when it attains any considerable size, protect it from the voracity of other fishes; ar when full-grown, even the pike dares not attack though the very young perches are its favourite foo Salamanders, small vipers, and young frogs, serve food to the perch; and M. de Lacepède has assur Baron Cuvier that they seize even young water-rats.

Several species of water-birds, however, pursue t perch with great avidity. It fears thunder, is afraid frost and ice, and has internal enemies in intestin worms; of which, according to Rudolphi, no less tha seven species are found in the body of the perch. Th fish is very tenacious of life, and Pennant asserts th it may be carried in dry straw for sixty miles witho much danger.—*Cuvier.*

Why is the stickleback so fatal to the perch?

Because the former often erects its sharp dors spines at the moment the perch is about to swallo it, which stick in the palate or throat.—*Cuvier.*

THE MULLET.

Why were large red mullets so highly prized by th Roman epicures?

Because they were more difficult to be got; no that the larger fish were more delicate. Juvenal say

The lavish slave
Six thousand pieces for a mullet gave
A sesterce for each pound.

—But Apicius gave 8000 *nummi*, or 64*l.* 11*s.* 8*d.* for fish of as small a size as a mullet.

SALMON.

Why do salmon, which begin to approach the coas and enter the rivers as stragglers about February, increase in numbers towards May and June?

Because the drought and heat of summer rende the *streams* unfit for their reception. At this perio they crowd, in shoals, towards the coast, and roan about the estuaries, until the autumnal floods agai entice them to enter the rivers.

Why do salmon spawn in the shallow gravelly fords at the top and bottom of pools?

Because they there make a bed by the parent fish working up against the stream, the spawn being deposited in the gravel and covered at the same time. The bed sometimes reaches from twelve feet in length to ten in breadth. The process frequently occupies more than a week; during which the eggs deposited by a single fish sometimes amount to 20,000. This spawning season extends from the end of October to the beginning of February, and, according to very satisfactory evidence, it occurs about the same time throughout all the rivers of the United Kingdom. The eggs of the salmon remain in the gravel for several months, exposed to the influence of running water. In the course of the month of March, and nearly about the same period in all our rivers, the fry are evolved. When newly hatched, they are scarcely an inch in length, of the most delicate structure, and for awhile connected with the egg. Upon leaving the spawning bed, the fry betake themselves to the neighbouring pools, where they speedily increase to two or three inches in length. In April, May, and June, they migrate towards the sea, keeping near the margin, or still water, in the river, and when they reach the estuary, they betake themselves to a deeper and more sheltered course, and escape to the unknown haunts of their race, to return shortly after as grisles, along with the more aged individuals. All these seaward migrations of the parent fish and the fry, are influenced and greatly accelerated by the occurrence of the floods in the rivers.—*Quarterly Review.*

Why do salmon rise better at the fly when the tide is rising, than when it is falling?

Because the turn of the salt water brings up aquatic insects, and perhaps small fish; and it is supposed that salmon know this, and search for food at a time when it is likely to be found.—*Salmonia.*

Why are certain rivers "fenced," or the fishing of salmon prohibited during some months of the year?

Because the breeding fish and the helpless fry may be preserved and protected.

Why is the par or samlet also called the finger-ling?

Because it has large blue or olive bluish marks on the sides, as if they had been made by the impression of the *fingers* of a hand.

Why do the smallest trouts spawn nearly at the same time with the larger ones?

Because, in the physical constitution of these animals, their production is diminished as their food is small in quantity. The ova of the large and small trouts are of the same size; but in the large trout there are tens of thousands, and in the small one rarely as many as forty.

Trouts vary in size, from the great lake trout, weighing above 60lb. or 70lb. to that of the brook, which is scarcely larger than the finger.

Why are there supposed to be so many varieties of sea-trout?

Because fresh-water trout are sometimes carried in floods to the sea, and come back larger and altered in color and form, and are then mistaken for new species; and as each river possesses a variety belonging to it, this, with differences depending upon food and size, will, it is thought, account for the peculiarities of particular fish, without the necessity of supposing them distinct species. The same holds good with regard to salmon.—*Salmonia.*

THE GRAYLING.

Why was the grayling called by St. Ambrose, "the flower of fishes?"

Because of its agreeable odour, and brilliant colours. A fine specimen is thus described:—"The belly is silvery, with yellow; and the pectoral, ventral, and anal fins, are almost gold-coloured; the back gray, with small black spots; and the black fin beautifully coloured bright purple, with black and blue spots." In flavour, the grayling is "like the most exquisitely tasted of all our fish, the red mullet."

The grayling is supposed to have been introduced by the monks, in the time when England was under the See of Rome, from the rivers that contain it being near the ruins of great monasteries. Thus, the Avon, near Salisbury; the Ure, near Fountain's Abbey; the Wye, near the great abbey of Tintern, &c. There are, however, rivers so situated, wherein the grayling is not found; for instance, in the Stour, at Canterbury.

THE PIKE.

Why is the pike considered one of the most voracious of fishes?

Because it devours not only fish, but also amphibia of all kinds, toads, &c.; many aquatic birds, small quadrupeds, and even crabs.

Stones, weighing 5 oz. and upwards, have sometimes been found in the stomachs of pikes, which must have been swallowed by them whole.

The Zetlandic fishermen assert, that cod-fish swallow stones before a storm, to enable them to rest more securely at the bottom of the sea, during the continuance of the agitated waves.—*Fleming*.

THE HERRING, BARBEL, ETC.

Why is the herring a most important animal in the northern world?

Because, though attacked by man, and many animals, as the grampus, gulls, &c., it multiplies with astonishing rapidity. Its great and regular migrations, during summer, along the coasts of Europe, particularly the Orcades, Norway, &c. have given employment to many thousand people, from the 12th century. —*Blumenbach.*

It is, however, asserted, that "we have no satisfactory authority for believing that herrings breed in the northern seas, when they have never yet been observed in the real icy seas; nor have they even formed a fishery on the coast of Greenland and Iceland. When they first appear on the coast of Scotland, it is not in shoals, but in small numbers; and they are then taken with a feather, or fly, and a rod. There is nothing to indicate a migration from the north; on the contrary, there is every reason to believe they breed in our own seas: but, both the time of their breeding, and their visits, are irregular and capricious. Much good money has been sunk by erecting buildings, and establishing fishing stations, which the herrings afterwards abandoned."—*Notes in Science*, 1828.

Sir Humphry Davy says: "The great supposed migrations of herrings from the poles, to the temperate zone, have appeared to me to be only the approach of successive shoals from deep to shallow water, for the purpose of spawning."—*Salmonia.*

In a recent paper, in *Jameson's Journal*, Major W. M. Morrison supports that view of the migration of gregarious fish, which leads to the supposition, that they do not actually travel from north to south; but that, in accordance with climate, successive shoals approach the coasts for the purpose of spawning; and this view he supports by some interesting facts. The nets of Hastings are always cast north and south, in order that they may drift with the ebbing and flowing of the tide, which takes the direction of east and west in that part of the British Channel; and it is curious, that while those fish which are encumbered with roes, are caught in great numbers on the east side of the nets, they are not met with in a greater proportion than one in about one hundred without roes on the west side.

At Cairo, the Arab cooks are said to prepare the herring for the table, in such a manner, as to intoxicate the eaters.

Why should the barbel be eaten with great care?

Because its roe is poisonous, and has often given rise dangerous symptoms when eaten.

Why has a species of chætodon the upper jaw ending a tube?

Because it may, through this tube, throw water on e insects upon aquatic plants, so that they may fall d become its prey.

Why is the jaculator fish of Java, so called?

Because it kills insects and other prey, by ejecting, om its tubular mouth, single drops of water. Thus, hen it spies a fly sitting on the plants that grow in allow water, it swims 4, 5, or 6 feet from them, and en takes aim as above, when it rarely fails to strike e fly into the sea, where it soon becomes its prey.

Why is a certain fish of Ceylon called the leaf-moon?

Because its outline has the appearance of a broad escent, in the centre of which, the tail, short and fan-aped, projects like a leaf.

ANGLING.

Why is a river better for fishing, after a flood from in?

Because it brings the fish up, who know when rain coming; and likewise brings down food, and makes e fish feed. But when the water is raised by a strong ind, the fish never run, as they are sure to find no crease in the spring-heads, which are their objects in nning.—*Sir H. Davy.*

Why do experienced anglers fish with their face towards e sun?

Because, though inconvenienced by the light, they not then alarm the fish; whereas, if they fished ith their backs to the sun, and it was not very high, eir own shadows, and those of their rods, would be rown upon the water, and the fish would be alarmed henever a fly was thrown.

Thus, Cotton wishes for

A day, with not too bright a beam;
A warm, but not a scorching, sun.

Why do fish not willingly haunt very deep water?

Because, even in summer, it is of very low temperature, approaching to 40°, and it contains little or no vegetable food or insects, which the smaller fishes search for; and the larger fishes follow the smaller. We cannot judge of the senses of animals which breathe water—which separate air from water by their gills; but it seems probable, that as the quality of the water is connected with their life and health, they must be exquisitely sensible to changes in water, and must have similar relations to it, that an animal with the most delicate nasal organs has to air.—*Sir H. Davy.*

Why does a flood, or a rough wind, assist the fly-fisher?

Because it not only obscures the vision of the fish, but, in a river much fished, changes the appearance of their haunts; large trouts almost always occupy particular stations, under, or close to, a large stone or tree; and, probably, most of their recollected sensations are connected with this dwelling.—*Sir H. Davy.*

Why is it evident that the inferior animals have a knowledge of time?

Because those which leave a particular dwelling at stated intervals, measure the distance they ought to travel, and return with regularity to their home. The sun appears to be their great regulator, as they are influenced by the changes which take place with his light and heat. Fishes, and other animals, which live in the sea, or search for food on its shores, appear to regulate themselves by the motions of the tide. The regularity of the crowing of the cock, has been long admired; but it appears difficult to point out the measure of time by which it is governed.*—*Fleming.*

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* See ORIGINS and ANTIQUITIES, Part III. p. 38.

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WORMS.*

GENERAL ECONOMY.

Why are certain animals called invertebral?

Because they are destitute of skull and vertebral column, for the protection of the brain and the spinal marrow.

Why are these animals furnished with crusts, scales, or hairs?

Because these appendices may supply the place of bones, and serve as a protection to the viscera, and as supports to the muscles. The blood, in those cases where a circulating fluid can be detected, is usually of a white or gray colour, seldom inclining to red.

Why are certain of these animals called mollusca?

Because they are soft, (from *molluscus*, Latin) and have no skeleton. Their muscles are attached to their skin, and their nervous system is irregular in its form and distribution.

Why are others called annulosa?

Because they have the body divided into joints or rings, (from *annulus*, a ring) and, they either possess articulated feet or have certain processes which supply their place.

Why are some mollusca enabled to creep?

Because they alternately contract and relax the foot, or expand their muscles, which serve as suckers, and make their motion analogous to that of serpents.

Why do others swim?

Because they make serpentine undulations of the foot and body, or exert tentacula, or expanded portions of the integuments. Many species rise or sink in the water by aid of an organ somewhat resembling the air-bladders of fishes. Others keep, or shift their position by a sudden jerk, produced by shifting the valves of the shell rapidly. The common scallop and the river mussel have the latter properties.

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* Arranged in Six Orders:—1. Intestina—2. Mollusca—3. Testacea—4. Crustacea—5. Corallia—6. Zoophyta.

Why have some of these animals extraordinary power of suction?

Because they may fix themselves more securely; the sucker acting in the same manner as the moistened circular piece of leather, with a cord fixed to its centre, and applied to the surface of a stone. In the limpet, its surface is smooth and uniform; and the adhesion appears to depend on its close application to every part of the opposing surface. In other animals, as the leech and sea-urchin, the sucker is formed at the extremity of a tube; the muscular motions of which may serve to pump out any air which may remain, after the organ has been applied to the surface of the body. In a third class, the sucker is more complicated in its structure, consisting of many smaller ones, so disposed as to act in concert, as on the breast of the lump-fish. Neither quadrupeds nor birds possess any sucker. It is found among a few reptiles and fishes. The extremities of the toes of many insects possess complicated suckers. Among the mollusca and zoophytes, there are few in which suckers in some form do not exist. By means of this organ, whose power of cohesion must depend, not only on the extent of its surface, but the strength of the muscles which produce the vacuum, these animals can remain in the same spot, although acted on by forces to which their own weight could offer no adequate resistance. Pennant states that he heard of a lamprey, which was taken out of the Esk, weighing three pounds, adhering to a stone of twelve pounds weight suspended at its mouth.—*Fleming.*

Why are zoophytes considered the lowest family of animals?

Because they have not a heart or system of vessels,

THE EARTH-WORM.

Why is the earth-worm so called?

Because it swallows the soil or earth, from which, in its passage through the intestines, it extracts its nourishment.* Mr. Leon Dufour has recently determined the earth-worm to be an oviparous and not a viviparous animal. The eggs resemble a chrysalis or a cocoon, but their pulp, &c. prove them to be true eggs.

The lower we go in the scale of creation, the more surprising is the reproductive faculty. The gardener cuts the earth-worm with his spade; but the injury, far from diminishing animal life, increases it; for each portion of the animal so divided, becomes a separate creature, having a system of parts speedily regenerated.

THE LEECH.

Why does the leech advance faster than other worms?

Because the organs of adhesion are double, one at each extremity, the mouth adhering to one part of the surface, while the tail is brought up towards it, and is fixed, the body being at this time like an arch. The head then quits its hold, the body extends itself, and, when at full length, the head is then attached, and the tail brought up. By these alternate movements, the leech, at every *step*, advances nearly the length of its own body.—*Fleming.*

The stomach occupies the greatest part of the body in the leech, and is divided internally, by means of ten imperfect fleshy partitions, into somewhat separate portions.

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* In a recent paper in the *Foreign Quarterly Review* we read of other earth-eaters, in South America, where the women, children, serpents, lizards, and ounces of the river St. Francisco have a singular and most economical propensity of eating earth. It seems that the soil contains a small portion of salt-petre, which is agreeable to the palate. Boys and girls, however, are less select in their tastes, and sometimes eat the whitewash off the walls, and occasionally, wood, charcoal, or cloth.

Why is the wound of the leech of three-sided form?

Because within its mouth are three semicircular projected bodies, with a sharp toothed edge, with which it bites.

Why is a certain species called the flying leech?

Because it has the power of springing, by means of a filament, to a considerable distance. It is much smaller than the common leech; the largest, when at rest, not being more than half an inch long, and may be extended till it becomes a fine string; the smaller ones are very minute. It is common in the jungles in Ceylon; Bishop Heber tells us that "the native troops on their march to Canely, suffered very severely from the bites of flying leeches, occasionally even to the loss of life or limb: their legs were covered with them, and streamed with blood."

SNAILS.

Why do snails carry their shells with so much ease?

Because they are bound to the shells by two muscles, which arise from the pillar, and having penetrated the body below its spiral part, run forward under the stomach, and spread their fibres in several slips, which interlace with those of the muscles proper to the foot, the substance of which they enter. It is obvious from this direction, that on their contraction, the body of the snail must be drawn within the shell. When it wishes to re-issue, the head and foot are forced out by circular fibres, which surround the body immediately above the foot.—*Cuvier.*

Blumenbach says "Whether the black points, at the extremities of what are called the horns of the common snail, are organs which really possess the power of vision, is still problematical."—*Compar. Anat.*

Why does the snail mark its track with a silver line of concrete slime?

Because the slime enables the slug to attach one part of its body more firmly to the surface on which it is moving, while it drags up the remainder to a new position.

In England the rustic maiden once read her fortune in the meanders of a snail:

> Last May-day fair I searched to find a snail,
> That might my lover's name reveal;

She placed it on "the milk-white embers spread," when

> Slow crawl'd the snail · and, if I right can spell,
> In the soft ashes mark'd a curious L.
> Oh! may this wondrous omen lucky prove,
> For L is found in Lubberkin and love.—*Gay.*

Why are snail-shells so often found adhering to rocks, &c?

Because the snails have then retired to torpidity, previous to which they have formed an operculum or lid from the mouth of the shell, by which they attach themselves, and at the same time close up even all access of the air. The winter lid of some snails resembles a piece of card paper.

All the land *testacea* (shell animals) appear to have the power of becoming torpid at pleasure, and independent of any alterations of temperature. Thus, snails, if placed in a box at midsummer, will attach themselves to its sides, and remain in this dormant state for several years. Even in their natural haunts, they are often found in this state during the summer season, when there is a continued drought. With the first shower, however, they recover, and move about, and at this time the conchologist ought to be on the alert.

Why do snail-shells become more brilliant when plunged into boiling water?

Because the skin or film with which they are covered, is then removed.

Why have some snail-shells elevated ribs, and others slight depressions?

Because the shell is gradually formed by the snail, by aid of a fold or membrane, to be perceived where the body rises into the shell. This part is denominated the *collar*, from the manner in which it surrounds the body, and it is the organ which secretes the shell. The animal is born with the rudiments of its future covering, and by its gradual increase of growth is enabled to push the collar for a space, and from time to time beyond the original margin. In these operations, a thin layer of membraneous and calcareous matter is excreted and deposited, which is gradually thickened by successive layers being laid on within the first, by the repeated protrusions and retractions of the collar. This portion being formed, the animal commences another, and finishes it in the same manner; and the extent of each portion is marked as above. There is not, as has been implied, a regular and alternate deposition of a layer of membrane, and a layer of lime; but, in all shells, the animal and earthy matters are obviously secreted and deposited at the same moment, and in commixture.

Why is the snail found in greater numbers, and thriving better, in chalky districts than elsewhere?

Because chalk is the snail's best food, and the food is the source of the lime of which it forms its shell. Lime is not, however, necessary to be eaten for the perfect formation of the operculum, (or lid of the shell) as is remarked in the *Zoological Journal* by Mr. Bell; many snails in his possession having formed that part, though during the whole summer they had no access to any preparation of lime.

Why do the land snails vary most in their colours?

Because they are most exposed to the operation of light; while those shells, which, within the bodies of their snails are always white, as are also those which live in holes whence they never issue. Another striking proof of the blanching effect of darkness is furnished by some bivalve shells, as scallops, permanently affixed by their lower valve, which is constantly white, while the upper one may possibly be variegated with bright colours.

Why was a certain species of snail reared with much pains among the Romans?

Because they were eaten as great delicacies among epicures. For this purpose, they were kept in sties, and fattened with bran and sodden wine; and on this generous fare they grew occasionally to such a size, that, according to Varro, the shell would hold full ten quarts! The younger Pliny's supper of three snails, two eggs, a barley cake, a lettuce, sweet wine, and snow, was therefore no very spare meal.

Snails are still eaten in great numbers on the continent of Europe, particularly in Lent. In Switzerland they are fed in many thousands together in gardens; in Italy they are much liked; in Paris they are sold in the market; and, in Vienna, they are charged at an inn the same as a plate of veal or beef, or a dish of frogs at a French restaurateur.* The Greeks are also great eaters of land-snails, but they have not the art of fattening them. The usual mode of preparing them for the table is either boiling, frying them in butter, or stuffing them with force-meat.

Why were edible snails introduced into England about the middle of the sixteenth century?

Because of their being recommended for consumptive complaints by the physicians of that day; indeed, snail-water is still to be found in the pharmacopœia of the last century.

Snails were introduced as above by Charles Howard, one of the earls of Arundel, who brought them from Italy for the cure of his countess. Sir Kenelm Digby likewise patronised the remedy. Elias Ashmole says, the earl scattered them on the hills about Dorking, in Surrey, and between Albury and Horsley, near Guildford. We have noticed, in our *Promenade round Dorking*, their being on Box Hill, where to this day large snails abound. They were also introduced a few years since into a curious garden in Scotland, where they did not prosper.

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* There is in Brussels a market for frogs, which are brought alive in pails and cans, and prepared for dressing on the spot. The hind limbs, which are the only parts used, are cut from the body with scissors, by the women who bring the animals for sale.

Why is the Cornwall mutton of superior flavour?

Because of the nourishment afforded to the sheep by feeding on snails. Thus, the sweetest mutton is reckoned to be that of the smallest sheep, where the sands are scarcely covered with very short grass. "From these sands come forth snails of the turbinated or spiral kind, which spread themselves over the plains early in the morning, and whilst they are in quest of their own food among the dews, yield a most fattening nourishment to the sheep."—*Borlase's Hist. Cornwall.*

Why are snails eagerly sought by the blackbird and the thrush?

Because they are substituted for their summer food, which winter may have destroyed. They break the shells of the snails, by reiterated strokes against some stone; and it is not uncommon to find a great quantity of fragments of shells together, as if brought to one particular stone for this very purpose.

THE MAN-OF-WAR.

Why is a certain worm called the man-of-war?

Because it has the skill and knowledge of an experienced navigator, and is in itself *a little ship.* Its evolutions are according to the winds; it raises and lowers its sail, which is a membrane provided with elevating and depressing organs. When filled with air, it is so light, that it swims on the surface of alcohol, and is at the same time provided with a structure which furnishes it with the necessary ballast. In high winds it descends into the deep. From the under side of the body proceed tubes, 20 feet in length, which wind in a spiral form like a screw, serving at once as anchors, defensive and offensive weapons, air-tubes, and feelers. It has the colours of the rainbow; its crest or sail is intersected with pink and blue veins; its length is from six to eight inches. The fibres contain a poisonous fluid, which stings like nettles. We abridge these curious facts from a Memoir of Dr. Tilesius, who accompanied Krusenstern in his voyage round the world.

CUTTLE-FISH.

Why does the cuttle-fish differ in structure from other mollusca?

Because it has three hearts—two of which are placed at the root of the two branchiæ; they receive the blood from the body, and propel it into the branchiæ. The returning veins open into the middle heart, from which the aorta proceeds.—*Cuvier.*

The cuttle-fish was esteemed a delicacy by the ancients. Captain Cook also speaks highly of a soup he made from it; and the fish is eaten at the present day by the Italians, and by the Greeks, during Lent.

Why does the cuttle-fish, when pursued, eject a black inky liquor?

Because it may darken the water, and thus hide itself from its enemies.

It is a completely mistaken notion, that the black fluid of the cuttle-fish is its bile; for the ink-bag is at a considerable distance from the gall-bladder. According to Cuvier, the Indian Ink, which comes from China, is made of the above fluid.

Why are the jaws of the cuttle-fish fixed in the flesh of the animal?

Because there is no head to which they can be articulated. They are of horny substance, and resemble exactly the bill of a parrot. They are in the centre of the lower part of the body, surrounded by the tentacula. By means of these parts, the shell-fish which are taken for food, are completely triturated.

Why have cuttle-fish small holes on their arms?

Because, by means of them, they fix themselves in the manner of cupping-glasses. These holes increase with the age of the animal; and, in some species, amount to upwards of 1,000. They have the power of reproducing their arms, which are often torn or nipped off by shell and other fishes.

The suckers of the cuttle-fish, are irregularly scattered on the arms and feet. The back is strengthened by a complicated calcareous plate, lodged in a peculiar cavity. This plate has long been known in the shop of the apothecary, under the name *Cuttle-fish bone*, which was formerly prized as an absorbent, but is now chiefly sought after for the purpose of polishing the softer metals.—*Fleming.*

Why is it improper to call this plate "bone"?

Because, in composition, it is exactly similar to *shell*, and consists of various membranes hardened by carbonate of lime, without the smallest mixture of phosphate.—*Hatchett, in Philos. Trans.*

The most remarkable species of cuttle-fish inhabits the British seas; and, although seldom taken, its bone is cast ashore on different parts of the coasts, from the south of England, to the Zetland Isles. We have picked up scores of these bones, or shells, on the Sussex coast, but never found a single fish.

The cuttle-fish, it may be added, is the only animal of its class, in which any thing has hitherto been discovered, at all like an organ of hearing, or has been shown to possess true eyes.

Why are sea-grapes, as they are called, often picked up on the sea-shore?

Because many kinds are the *ovaria*, (or egg-bags) of cuttle-fish, and similar species.

Why are certain sea-worms called animal flowers?

Because they display beautiful membraneous expansions, resembling the petals of flowers: these are, in fact, the breathing organs, acting at the same time as tentacula.

Why does the stomach of some medusæ resemble the roots of trees?

Because it has branching tentacula, on which canals commence by open orifices; these unite together to form larger tubes; and the successive union of these vessels, forms at last four trunks, which open into the stomach, and convey the food into that cavity. Cuvier has formed a new genus, under an appellation derived from the above comparison—the *rhizostoma;* from the Greek words, a root and a mouth.

TESTACEA—SHELLS.

Why is the study of shells much more important than some would represent?

Because, being found in abundance, in a great variety of rocks and positions, they constitute the *medals of the ancient world;* and, from an accurate acquaintance with their different species, and with the nature of the animals that represented them, many curious and important deductions respecting the formation and changes of the crust of the earth may be drawn.—*Thomson's Hist. Royal Soc.*

Testacea, (or shell animals) are classed in families, according to the number and form of the shells. Thus *multivalve*, or with many valves; *bivalve*, muscles, &c.; *univalve*, with regular windings, snails; and *univalves*, without such windings.

Why have shells served many purposes more useful than that of ornament?

Because of their service in the domestic economy of various nations. Thus, in the south of China and in India, the thin layers of some large flat shells, when polished, are used instead of glass for windows. Many of the domestic utensils of savage people are shells; and it must have been observed, that we frequently imitate these in our porcelain. In India, drinking-cups are formed of the nautilus; and in other less civilized nations, shells are converted into knives, spoons, fishing-hooks, razors, &c. In Zetland, a certain shell, suspended horizontally by a cord, is used as a lamp, the canal serving to hold the wick, and the cavity to contain the oil. Is it not probable that some of the most elegant patterns left us by the Greeks have been suggested by a similar primitive practice?

In mentioning the benefits of shells, we must not forget the celebrated Tyrian purple, which was procured from a univalve shell fish, and was contained in a transparent and branching vessel, placed behind the neck of the animal. A shell, called *Purpura*, of our own shores, furnishes a liquid of similar qualities, and is supposed to have been resorted to by the ancients.

Why was the term "shell" formerly expressive of the greatest hospitality?

Because, in the days when Ossian sang, the hollow shells of the scallop were the drinking-cups of Fingal and his heroes, and the flat shells their plates. Thus, in Ossian: "Thou, too, hast often accompanied my voice in Branno's hall of shells." "The *joy of the shell* went round, and the aged hero gave the fair."

Why do shells increase in size?

Because they consist of layers of an earthy salt, with interposed membranes of animal matter, resembling coagulated albumen, and they grow, by the addition of layers of new matter, to the edges and internal surface. When broken, the animal can cement the edges, and fill up the crack, or supply the deficiency when a portion is abstracted.—*Fleming*.

As an instance of the great strength of such cement, it was, in 1829, stated in *Brande's Journal*, that the large snails which are found in gardens and woods, discharge a whitish substance, with a slimy and gelatinous appearance, which has been known to cement two pieces of flint so strongly, as to bear dashing on a pavement without the junction being disturbed, although the flint broke into fragments by fresh fractures.

Why are shells of different colours?

Because the colour is secreted by the animal, along with the matter of the shell.

Why is the inner surface of all shells very smooth, and apparently denser and harder than the outer?

Because the animals, to form this inner layer, excrete the lime in nearly a pure state, that is to say, mixed with much less animal matter; so that, in concreting, the particles become very close and compact, and receive a polish from the repeated frictions of the soft parts.

Why does a dry thin skin cover the external surface of most shells?

Because, being a dried sheet of coagulated albumen effused at the same time, or, perhaps, even prior to the first layer, it may protect the subjacent or more chalky layers from the action of the air or water during their consolidation.—*Mr. Gray, in the Zoological Journ.*

Blainville, and the French naturalists, generally, suppose that the above covering is the true epidermis, or scurf-skin, raised from its position by the deposition of the shell underneath it; but we think this is not tenable.

Why are old shells remarkably strong?

Because a shell having attained its full growth, the changes which the animal further effects are almost limited to some increase of its thickness; not, however, by the addition of any new layers, but by the effusion of vitreous matter. Hence, holes and canals, previously visible, are now filled up; the aperture contracted, and the margins strengthened and enlarged; the upper part of the spire, perhaps, filled and made more solid. The external layers now lose their epidermis; the colours become paler; parasites deform and perforate the outer surface; death at length ove takes the architect, and the shell decays under the i fluences of the water and the air. What an epiton is this of the proudest life,—till death

> Comes at the last, and with a little pin
> Bores through his castle-wall, and—farewell king.

THE PIERCE-STONE.

Why is a certain worm called the pierce-stone?

Because it bores passages in rocks, even in tl hardest marble, in the stems of coral, oyster-shells, tl bottoms of ships, &c. and excavates a habitation at tl termination of the passage.—*Blumenbach.*

The *Lithophagus* is another of these stone-borii animals, and an instance of its depredations on tl hardest marble is shown by the celebrated, but my terious, phenomenon, of the three large columns (*Cippolino antico*, in the temple of Serapis, at Pozzuol which, though at an elevation of twenty-seven fe above the level of the Mediterranean near them, a perforated in a circular manner by these animals.

THE OYSTER.

Why is the shell of the oyster termed "fixed"?

Because it has one valve cemented to the rocl and though the oyster itself has a heart, blood-vessel brain, gills, and stomach, it depends on the bounty (the waves for all the objects of its sensation and nou rishment. It is, however, an admirable provision of n ture, that although the oyster and other natives of tl water are thus stationary themselves, the fluctuatio of the element in which they live, produce a variety the scene, and daily bring new objects in contact wi their organs of sensation.

Of oysters there are several species. Thus, in little *Manuel de l' Amateur d'Huitres*, before us, v count upwards of forty-five different kinds which a known to naturalists.

Why does an oyster open its shell at the time of floo

Because it may participate and enjoy the returning ide. This is done, as well as the shell closed, with rodigious force, by means of a strong muscle at the inge.

Mr. Carew, in his *Survey of Cornwall*, 1602, tells us f an oyster having opened its shell, and three mice ttempting to seize it; but the oyster clasped fast its hell, and killed them all.

THE MUSSEL.

Why is the common mussel enveloped in a thread-like ubstance termed byssus?

Because these threads are united in the body to a ecreting gland, furnished with powerful muscles, and, t the other extremity, glued to the rock or other body which it connects itself.—*Fleming*.

Why are the pinnæ, or sea-wings prized?

Because of their beard, by means of which they ttach themselves, and from which gloves, &c. are anufactured at Smyrna, Tarentum, Palermo, &c.

A pair of gloves made of this material may be seen the British Museum.

PEARLS.

Why are pearls found in the oyster?

Because they consist of the morbid secretions of the sh, situated either in the body, or lying loose between, and shell; or, lastly, fixed to the latter by a kind of eck. It is said they do not appear until the animal as reached its fourth year. There is nothing pecuar in their chemical composition, being merely caronate of lime.

The Romans gave almost incredible prices for earls. Their finest pearls were from the Gulf of ersia, and the Indian Ocean; though it is matter of istory that Cæsar was induced to invade Britain om some exaggerated accounts he had heard of the earls of our coasts, or rather of our rivers; but, if these were his objects, the mercenary conqueror was disappointed, for they were found to be of bad colour and inferior size, nor have they since improved.

Why did Linnæus owe his patent of nobility to the pearl?

Because he received that elevation for a discovery of causing the fresh-water mussels of Sweden to produce pearls at his pleasure. It is conjectured that he accomplished this by drilling small holes through the shells; but his method is not certainly known.

THE NAUTILUS.

Why is the Paper Nautilus also called the Argonaut?

Because of its origin from *Argonautes*, the companions of Jason, in the celebrated ship Argo, and from the Latin *naus*, a ship; the shells of all the Nautili, having the appearance of a ship with a very high poop. When *sailing*, the animal expands two of its arms on high, and between these supports a membrane which serves as a sail, hanging the two other arms out of its shell, to serve as oars, the office of steerage being generally served by the tail.

When the sea is calm, whole fleets of these Nautili may be seen diverting themselves; but when a storm arises, or they are disturbed, they draw in their legs, take in as much water as makes them specifically heavier, than that in which they float, and then sink to the bottom. When they rise again, they void this water by numerous holes, of which their legs are full.

The cuttle-fish, from its frequently being found in the shell of the Argonauta, was long considered the fabricator of the shell; but, more recent observation has proved it to be merely the piratical occupant.

END OF PART VIII.

KNOWLEDGE FOR THE PEOPLE:

OR THE

PLAIN WHY AND BECAUSE.

PART IX.—ZOOLOGY—INSECTS.

ZOOLOGY.

INSECTS.

GENERAL ECONOMY.

Why are insects so called?

Because they have a separation in the middle of their bodies, whereby they are cut (*insectus*, cut or notched, *Lat.*) into two parts, joined by a small ligature, as in the common house-fly.

Why are the history and descriptions of insects called Entomology?

Because of the origin of that term from the two Greek words, *entoma*, insects; and *logos*, a discourse.

Why is the study of insects a source of perpetual variety?

Because the localities of insects are, to a certain extent, constantly changing. Insects, also, which are plentiful one year, frequently become scarce, or disappear altogether the next—a fact, strikingly illustrated by the uncommon abundance in 1826 and 1827, of the seven-spot lady-bird in the vicinity of London, though during the two preceding summers, this insect was comparatively scarce, while the small two-spot lady-bird was plentiful.—*J. Rennie.*

Why did the ancient philosophers believe that maggots, flies, and other insects, were generated from putrifying substances?

Because they were found about animal bodies in a state of decomposition; and the circumstance was merely noticed without any previous or accurate observation of the means by which they were first produced.

The fact is now established, that all insects come from eggs, as plants do from seeds.

Why is the life of insects the briefest of all existence?

Because the males rarely survive the inclemency of the first winter, and the females die after having deposited their eggs.

Why may the ephemeral nature of many tribes of insects be considered rather apparent than real?

Because the wonderful metamorphoses to which they are subjected, conceal their identity from the eye of the uninitiated, and greatly interfere with a continuous tracing of the same individual, from the egg to the perfect form. For example—many aquatic flies, such as the Ephemeræ and others, whose declared and more obvious existence, does not exceed a few hours, have, previous to their assuming the winged state, spent months or even years in the banks of rivers, and beneath the surface of the stream.

Why is the Linnæan arrangement of insects considered superior to others?

Because the primary divisions of Linnæus are taken from circumstances connected with the condition of the wings. The simplicity of this method, and the obviousness of the characters which have been employed, have secured for this system a decided preference among the entomologists of Britain.—*Fleming.*

Why is the first Linnæan order of insects called Coleoptera?

Because they have wings in sheaths: (*koleos, a* sheath—*pteron,* a wing;) as the common black-beetle:—4,087 species.

Why is the second order called Hemiptera?

Because they have half of one wing overlaid by the other: (*hemisu,* half—*pteron,* a wing;) as the common cockroach:—1,427 species.

Why is the third order called Lepidoptera?

Because they have wings covered with very fine scales: (*lepis*, a scale—*pteron*, a wing;) as the butterfly:—2,570 species.

Why is the fourth order called Neuroptera?

Because they have reticulated or nerved wings: (*neuron*, a nerve—*pteron*, a wing;) as the dragon-fly: —174 species.

Why is the fifth called Hymenoptera?

Because they have membraneous wings: (*hymen*, a film—*pteron*, a wing;) as the bee:—1,265 species.

Why is the sixth order called Diptera?

Because they are two-winged: (*dis*, twice—*pteron*, a wing;) as the common gnat:—692 species.

Why is the seventh order called Aptura?

Because they have no wings: (*a*, privative—*pteron*, a wing;) as the spider and the centipede:—679 species.

About thirty years ago, the recorded number of insects amounted to about eleven thousand; but a great additional number has since been discovered and described: Humboldt says 44,000.

Why is it evident that the nourishment in insects is not merely calculated for the preservation of the individual, but more particularly for the purpose of consuming organized matter?

Because insects must eat,—not solely to satisfy hunger, but also to destroy carrion, to annihilate other insects, to extirpate weeds, &c.; an admirable provision, to the execution of which, besides the almost incalculable number of species, the extremely rapid multiplication of many, the unexampled voracity of others, and the quickness with which digestion is carried on in their very short intestinal canal, all tend to contribute. Thus, it is known, that a caterpillar will, in twenty-four hours, consume more than three times its own weight.—*Blumenbach.*

Why may the abode of insects on and under the surface of the earth, be considered as much less limited than that of the other classes of animals?

Because they are found on almost all warm-blooded animals; and even the larger insects, as bees, chaffers, &c. are infested by peculiar kinds of lice. There are but few plants, also, (such as, perhaps, the yew, savine, and most tree-mosses,) which do not serve for the abode and support of known insects. Many again, as the oak, are frequented and inhabited by more than a hundred distinct species. Generally, however, as insects are diffused over the earth, the residence of individual species is not less frequently limited to a very small number of animals and plants, or even particular parts of them.

Why are insects so serviceable in the general economy of nature?

Because some destroy numerous kinds of weeds in the bud, or extirpate them when full grown. Others feed on carrion, live in dung, &c., and thus destroy, disperse, and change noxious animal substances; on the one hand, obviating the infection of the air; and on the other, promoting the fertilization of the earth. It is in this way, for instance, that flies are so serviceable in warm climates. So again, innumerable insects effect the impregnation of plants in a very remarkable manner.

Why are insects important in the arts?

Because of the ready adaptation of their labours to many of the conveniences of life. Thus, mead is prepared in many parts of Europe from the honey of bees; silk is employed for clothing: several insects, as cochineal, afford excellent dyes. Galls are employed for ink; wax, for lights, [illegible] other purposes. Lac, employed to make varnish, sealing-wax, &c. is produced by a certain Indian species of coccus. As medicines, we have Spanish flies, ants; and, adds Blumenbach, the oil-beetle, recommended for hydrophobia, and many beetles for relieving tooth-ache.

Why are the eyes of certain insects termed compound?

Because they consist of an aggregation of smaller eyes, or those which are termed *simple;* for their general convexity is divided into one immense number of small hexagonal or six-sided convex surfaces, which may be considered cornea. Simple eyes are formed in the larvæ of many winged insects, which upon their last or complete metamorphosis, at the same time that they receive their wings, gain the large compound eyes. The late Mr. T. Carpenter, the optician, of Regent-street, paid more attention to this branch of entomology than any man of his time. By aid of a powerful microscope, he experimented upon upwards of 200 insects; the most familiar of which were the boat-fly, dragon-fly, ant, gnat, bee, wasp, ichneumon, cockchaffer, peach-fly, earwig, grasshopper, locust, cricket, and cockroach. His results were a conviction that the whole of these insects did really possess numerous and distinct eyes, varying in number according to the species of insect; in some, upwards of 40—in others, 1,000; and upwards of 30,000 in some species! The eyes of the libellula, or dragon-fly, Mr. Carpenter says, are, on account of their size, peculiarly well adapted for examination under the microscope. They are a couple of protuberances immovably fixed in the head, and divided into a number of hexagonal cells, each of which contains a complete eye. The external parts of these eyes are so perfectly smooth, and so well polished, that when viewed as opaque objects, they will, like so many mirrors, reflect the images of all surrounding objects: each of these protuberances, in its natural state, is a body cut into a number of facets, like an artificial multiplying glass—but with this superiority in the workmanship, that as in that glass every facet is plain, here every one is convex; they are also much more numerous, and contained in a much smaller space. Each of the eyes is an hexagon, varying in size, according to its situation in the head; and each of them is a distinct convex lens, and has a similar effect of forming the image of an object placed before it.

Blumenbach observes, compound eyes seem calculated for seeing at a distance; simple eyes, for looking at near objects; at least it may be supposed so, as we find that butterflies, in their perfect winged state, have such large compound, telescopic eyes; whilst, as caterpillars, they have small simple ones. Only a few insects can move their eyes, and from this fact has been deduced a probable explanation of at least one object of the numerous facets or surfaces of which the compound eyes of insects are composed.

Leuwenhoeck has counted 17,235 facets in the cornea of a butterfly.

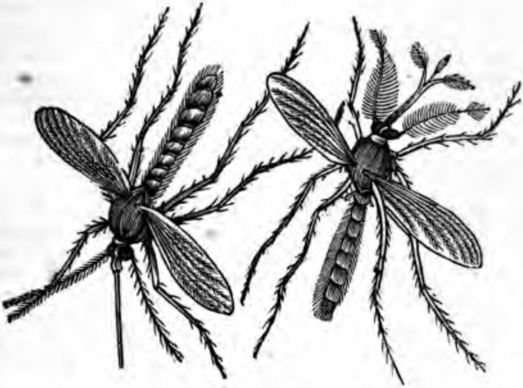
Why have insects antennæ or feelers?

Because the organ of touch is not generally distributed over the body, and the antennæ are considered as appropriated to this sense. These organs are two or more in number, and are present in all the crustacea and insects, but wanting in the arachnidæ, or spider genus. They are situated on the head, usually between the eyes and the mouth. They consist of a number of joints, in general capable, by their flexibility of examining the surface of a body.—*Fleming.*

Why are these antennæ particularly necessary to insects?

Because of the insensibility of their outward coat, which is generally of a horny consistence; and also from their eyes being destitute, in most instances, of the power of motion.

The feelers of insects are better adapted for exploring the condition of the surfaces of bodies than any organ which *we* possess. But their sensibility of touch is limited to particular qualities, or confined within



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narrow bounds. The human hand, on the contrary, by its motions, the pliability and strength of the fingers, and the softness of the surface, is the most extensive and perfect organ of touch possessed by any animal.—*Fleming.*

Why have insects cushions on the under surface of their joints?

Because these cushions being either soft and smooth on the surface, or enlargements closely covered with short hairs, by their elasticity and resistance, aid the animal in climbing and leaping. They have likewise suckers, which, in all, are capable of being applied to the surface of a smooth body. By these means those insects which walk upon walls and trees, are enabled to overcome the resistance of gravitation.

Why does the mouth of crustacea and some insects differ from that of red-blooded animals?

Because it is formed of two or more jaws placed laterally; these move from without inwards, and, *vice versâ*, whereas those of red-blooded animals move from above downwards, and back again. The parts which are termed the lips of insects, are two bodies; one of which is placed above or in front of the jaws, and the other below or behind them. The palpi (or short antennæ) are articulated to the jaws.—*Notes to Blumenbach's Comp. Anat.*

Why have all insects with jaws the power of masticating hard animal and vegetable substances?

Because these parts are of a firm, horny texture, and in many cases are very large, when compared with the size of the animal. The locust, the dragon-fly, the beetle, especially the stag-beetle, are examples in which the edges are very large and manifest, and often possess tooth-like edges.

Why does the sting of insects not only pierce the skin, but leave considerable pain?

Because the sting is hollow, and conveys the irritating or poisonous fluid within the wound, from a peculiar bag.

Why does the sting usually remain in the wound which it inflicts?

Because it is barbed at the sides of its point.

Why have insects without jaws long tubular tongues?

Because *they* derive their nourishment chiefly from liquids, which they get from animal or vegetable substances by means of this spiral or tubular tongue, or a soft proboscis with a broad opening, admitting of extension and retraction; or a horny pointed tube, containing sharp bristly bodies internally.

In many species of the butterfly, this proboscis, when not in use, is coiled up like a watch-spring.

Why are insects supposed to possess the organs of hearing, although no traces of such organs have been detected in them?

Because they emit a variety of sounds by the friction produced by their mandibles, their wings, and their legs, which are communicated to others, and understood by them. The proofs of the existence of taste and smell in the different tribes, rest on the same foundation, the evidence of the function being performed. These senses are chiefly used in the animal economy in subserviency to the digestive system. The organs in which they reside are probably the palpi (resembling short antennæ) or the other more flexible parts of the mouth. But these parts are so different in their form from the organs employed for the same purpose in the higher classes of animals, and so diminutive in size, that neither analogy nor dissection can be called in to illustrate the subject.—*Fleming*.

Numerous facts have long ago proved that several insects can distinguish the odorous properties of bodies even at considerable distances. But the organ in which that sense resides has not been clearly pointed out.—*From the German.*

Why is the alleged cruelty of entomological pursuits but a futile objection to the practical studies of natural history?

Because cruelty is an unnecessary infliction of suffering, when a person is fond of torturing or destroying God's creatures from mere wantonness, with no useful end in view; or when, if their death be useful and lawful, he has recourse to circuitous modes of killing them, where direct ones would answer equally well. In utility, the sportsman, from his primary object being amusement, must yield to the entomologist, who adds to the general stock of mental food,—often supplies hints for useful improvement in the arts and sciences, and the objects of whose pursuits, unlike that of the sportsman, are preserved, and may be applied to use for many years. Again: in proportion as we descend in the scale of being, the sensibility of objects that constitute it diminishes. The earth-worm, so far from being injured by cutting, thereby acquires an extension of existence.* Insensibility almost equally great may be found in the insect world. This might, indeed, be inferred *a priori*, since, Providence seems to have been more prodigal of *insect life* than of that of any other order of creatures, animalculæ perhaps alone excepted. We abridge the spirit of this ingenious defence from the valuable *Introduction to Entomology*, by Kirby and Spence, who illustrate the position by observing, "It is not easy, in some parts of the year, to set foot on the ground without crushing these minute animals.* * * Can it be believed that the beneficent Creator, whose tender mercies are over all his works, would expose these helpless beings to such innumerable enemies and injuries, were they endued with the same sense of pain and irritability of nerve with the higher orders of animals?" Instead, therefore of believing and being grieved by the belief, that the insect we tread upon

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* See EARTHWORM, page 203.

> "In corporal sufferance finds a pang as great
> As when a giant dies,"

the very converse is nearer the truth. "Had a giant lost an arm or a leg," continue the authors just quoted, "or were a sword or spear run through his body, he would feel no great inclination for running about, dancing, or eating. Yet a tipula (crane-fly) will leave half its legs in the hands of an unlucky boy who has endeavoured to catch it, and will fly with as much agility and unconcern as if nothing had happened to it; and an insect impaled on a pin will often devour its prey with as much avidity as when at liberty. Were a giant eviscerated, his body divided in the middle, or his head cut off, it would be all over with him; he would move no more; he would be dead to the calls of hunger, or the emotions of fear, anger or love. Not so our insects: I have seen the common cockchaffer walk about with apparent indifference after some bird had nearly emptied its body of its viscera; a humble-bee will eat honey with greediness though deprived of its abdomen; and I myself lately saw an ant, which had been brought out of the nest by its comrades, walk when deprived of its head. The head of a wasp will attempt to bite after it is separated from the rest of the body; and the abdomen, under similar circumstances, if the finger be moved to it, will attempt to sting."

Why do insects live, and (so far as we can perceive,) feel comparatively little pain from the loss of their limbs?

Because, though possessed of nerves, they have nothing similar to our brain and spinal cord, the two sources of our nerves of feeling and of motion; but, instead of this, they have a chain of ganglia, or bundles of nervous substance, and from each of these bundles, nerves branch out to the parts contiguous, each ganglion forming the centre of feeling to the parts to which its nerves run, or having its own set of nerves.

Many curious particulars connected with the great tenacity of life in insects are mentioned by entomologists, as well with a view to illustrate the animal economy, as to defend their favourite pursuit. Riboud stuck different beetles through with pins, and cut and lacerated others in the severest manner, without greatly accelerating death. Leuwenhoeck had a mite which lived eleven weeks transfixed on a point for microscopical observation. Vaillant caught a locust at the Cape of Good Hope, and after excavating the intestines, he filled the abdomen with cotton, and stuck a steel pin through the thorax, yet the feet and antennæ were in full play after the lapse of five months. A decapitated beetle will advance over a table, and recognise a precipice on approaching the edge. Colonel Pringle decapitated several libellulæ, or dragon-flies, one of which afterwards lived for four months, and another for six; and, which seems rather odd, he could never keep alive those with their heads on above a few days. Mr. Haworth, the well-known English entomologist, being in a garden with a friend who firmly believed in the delicate susceptibility of insects, he struck down a large dragon-fly, and in doing so he unfortunately severed its long abdomen from the rest of its body. The mutilated insect after this devoured two small flies. Mr. Haworth then contrived to form a false abdomen, by means of a slender portion of a geranium; after which the dragon-fly devoured another fly, and, on being set at liberty, it flew away with as much apparent glee as if it had received no injury. It is well known to practical entomologists, that large moths found asleep during the daytime, may be pinned to the trunks of trees without their appearing to suffer such a degree of pain as even to awake them. It is only on the approach of the evening twilight that they seek to free themselves from what they must nc regard as an inconvenient situation.*

Considerations such as those glanced at in th ceding page can never, of course, be so miscor as to afford any palliation to wanton or incons cruelty to the brute creation.

Why does the skin of insects differ from that vertebral animals?

Because, in insects, the skin serves the doub pose of protection and support, and represe cutaneous and osseous system of the latter. Its ture appears much more simple than in the classes, as it can neither be said to possess a n or cellular web or true skin. It bears the near semblance to the cuticle of the skin of the classes, or, rather, all the laminæ of perfect ski here incorporated into one uniform plate. In genera it is soft and pliable; while, in oth some of the weevils, it approaches the consiste bones, or appears as a calcareous crust in the In some species it is elastic, in others br (*Fleming.*) Again, the coat, composed of portions, moving on one another like the pie a gauntlet, also serves to protect the insect fro effects of various accidents.

Why are not the spines and hairs of insects rubbed off?

Because they are merely elongations of th It is otherwise with scales. Some of these are in into the skin at one end and left free at the oth in some insects are so feebly connected, as to by touching them with the finger. These sc the butterfly, bear a remote resemblance to feat their form.

Why do many insects leap, with ease, forwards wards, and laterally?

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* See Encyclop. Brit., art. Animal Kingdom, vol. iii. 7th e

Because the thighs of their hind legs are of uncommon size, to give room to the requisite number of muscles.

Why do insects fly?

Because the muscles which move their wings take their rise in the breast, and are capable of executing their functions with great celerity.

The flying insects do not possess rapidity of flight proportional to the number and size of their wings. In the coleoptera, the body hangs down during flight, while in other classes it preserves nearly a horizontal position.

The wings are composed of two membranes, an upper one, in which nervures or cords are traced; a lower one, separable from the upper. These nervures or cords contain a spiral vessel, "whence they appear," says Kirby, "to be air vessels communicating with the trachea in the trunk. The expansion of the wing at the will of the insect is a problem that can only be solved, by supposing that a subtle fluid is introduced into these vessels, which seems perfectly analogous to those in the wings of birds; and that thus an impulse is communicated to every part of the organ, sufficient to keep it in proper tension: we see by this, that a wing is supported in its flight like a sail by its cordage."

Why are the wings of insects important to the naturalist?

Because they, in a great measure, furnish the characters employed in classification. Thus, the presence or absence of wings—their number and appendices —their texture and consistence, together with their size, position, and manner of folding up, yield marks which are easy of detection, and which experience has found to be perfect.—*Fleming.*

Why are the upper wings of insects called elytra or wing-cases?

Because they serve as a covering to the inferior ones. Strictly speaking, these elytra are not wings, since they perform no other motion than elevation and depression, and serve merely to protect the wings when at rest, not to assist them when flying.

Why are not aquatic insects wet with the water in which they reside?

Because the skin is probably smeared with some unctuous matter; comparative anatomy hitherto having failed in detecting any glands subservient to the functions of the skin. In some instances, indeed, the skin resists being wet, even after the death of the animal has taken place for some time, but previous to becoming dry.—*Fleming.*

Dr. Arnott physically attributes it to the weight of the insects not being sufficient to overcome the cohesion of the particles of water among themselves.

In the tribes which swim, the legs are either flattened like the blade of an oar, or produced and ciliated (fringed) on the edges. Some swim upon their back, others upon their belly. Some keep always floating upon the surface, others dive and perform their movements at various depths, regulated by the condition of the organs of respiration.—*Fleming.*

Why were insects and worms formerly called bloodless animals?

Because they are distinguished from the preceding classes by the absence of red blood, in place of which they have a white fluid. In recent times, on account of the absence of vertebræ and ribs, they have received the name of Invertebral Animals.

Among the crustaceous animals, as the lobster and shrimp, the blood is white; while, among some insects, as the grasshopper, and white caterpillar, it is green.—*Hewson, Phil. Trans.*

Why are insects supposed to possess a heart?

Because, both in their perfect and larvæ state, they have a membranous tube running along the back, in

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which alternate dilatations and contractions may be observed; but it is closed at both ends, and no vessels can be perceived to originate from it.

Why are not insects concluded to take in air through the mouth?

Because they are furnished with air-vessels or trachea, which ramify over most of their body. These tracheæ are much larger and more numerous in the larva state of such insects as undergo a metamorphosis (in which state also the process of nutrition is carried on to the greatest extent) than after the last, or, as it is called, the perfect change, has taken place.

Why is the mode of respiration observable but in few insects?

Because they in general breathe not by the mouth, but by many *spiracula*, or pores. The greater number of them can live in a vacuum much longer than red-blooded animals, and many in mephitic atmospheres, so fatal to others, and in which animal and vegetable substances become putrid.

Why is the metamorphosis of insects so called?

Because there is not any winged insect which escapes from the egg as such, but all, as well as many insects which have not wings, must first undergo a kind of *change*, at a certain period of their existence. Such insects are called *larvæ*, whilst in the state in which they escape from the egg. They are mostly very small on their first appearance, so that a full-grown caterpillar of the willow moth, for instance, is 72,000 times heavier than when it first issues from the egg. On the other hand, they grow with great rapidity, so that as an example, the maggot of the meat-fly, at the end of twenty-four hours, is 155 times heavier than at its birth. Larvæ are incapable of propagating; they merely feed, increase, and change their covering several times.

The larvæ become nymphæ. Many can move about and take food in this state. Others, on the contrary, are covered up, as pupæ, (chrysalides, aureliæ) and pass this portion of their life in a state of torpor, without eating or moving. A great change is, however, going on, by which the animal quits its larva state, and leaves its prison a perfect insect.

In popular language, a caterpillar or grub is furnished with feet, and a maggot or gentle is without feet.

Why is the metamorphosis of insects so remarkable a branch of their economy?

Because, by this, not only their external form, but also at the same time their internal structure, contrary to common opinion, is altered in a certain degree. Blumenbach remarks, if the moth existed already formed in the caterpillar, we should at least expect that similar moths should be produced by similar caterpillars. But many American caterpillars, which resemble European ones in the closest manner possible, give origin to moths having totally different forms; and, on the other hand, many remarkably similar moths of both these parts of the world are developed from caterpillars altogether unlike.

Why do certain larvæ form an exterior covering or cocoon?

Because the pupa may be lodged with greater safety. This covering is in some composed of threads of silk. Sometimes only one or two threads are required to keep the pupa in a proper position; in others, the silk is woven into cloth, or so matted together, as to resemble paper. The matter, of which these cases or cocoons are fabricated, is prepared by two long tubes, which take their rise in the abdomen, enlarge as they approach the head, and terminate by a duct, which opens under the labium, or lower lip. By pressing the orifice of this duct to one place, and then to another, the larva draws out the tenaceous threads.—*Fleming.*

Why is the pupa so called?

Because the larva, when so enclosed, resembles an infant in swaddling bands. From the pupæ of many of the butterflies appearing gilt as if with gold, the Greeks called them *Chrysalides*, and the Romans *Aureliæ*, and hence naturalists frequently call a pupa *chrysalis*, even when it is not gilt.

Why do certain insects neither eat nor move when in the pupa state?

Because they derive their nourishment from their stores of fat.

Why are the larvæ more voracious than the perfect insects?

Because their digestive organs are of much greater dimensions than when arrived at maturity; and in the condition of larvæ, insects possess a variety of members, as legs, suckers, hairs, and even stigmata, (respiratory organs) which they do not possess in their maturity.—*Fleming.*

Why have most of the rings of the abdomen an open pore placed laterally?

Because they may serve as breathing holes, through which the fluids of the animal become aërated.

The three portions of the body of insects, the trunk, head, and abdomen, in the different tribes, exhibit very remarkable combinations. In some of the crustaceous animals, these portions are incorporated in the dorsal (or back) surface of the body. In some of the arachnidæ, (or spider genus) the head and trunk are niched, while, in others, the head appears to be distinct, while the trunk and abdomen are incorporated. These modifications are extensively employed in the methodical distribution of the groups.

Why do insects attach their eggs to certain substances?

Because the young, being hatched, are destined to feed on those substances. Thus, the butterfly attaches her eggs to a leaf; the flesh-fly deposits her's upon carrion; while others insert them into the young of other insects.—*Fleming.*

Why are the eggs of insects, when deposited in the open air, covered by the mother with a kind of varnish?

Because they may thus be protected from the destructive influence of rain, and other accidents.

Among other peculiarities of the propagation of insects, many, as the cochineal worm, the laced-flea, &c. become of an enormous size during pregnancy: thus, in the white ant, it has been calculated that the abdomen of the female, when about to lay her eggs, is 2000 times larger than previous to impregnation.

Why are insects generally considered unsocial?

Because only a few of them afford mutual assistance in their labours. The greater number follow their pursuits singly; many, as spiders, live in society when young, but afterwards separate, and live in a state of solitude, seeing creatures of the same species only at the time of pairing. Swift very aptly observes, "suspense is the life of the spider."

The labours of such insects as live in communities are, however, very remarkable; since they thus build common residences, by their united powers, and under the guidance of an extremely regular, geometrical, innate instinct. There are but few creatures of this class which do not, at least once in their life, give proofs of this natural power of construction; either as the cloth moth and water moth, form a habitation in their incomplete and larva state; or, like others, spin and prepare a receptacle to contain them during their metamorphosis and death-like sleep; or, like the lion-ant, dig pits: or, like the spider, weave webs for their prey, and bags or nets for the security of their posterity, and in which they deposit their eggs.

All those insects which live in society, when exposed to cold, are observed to cluster together, as if to keep each other warm. Some, indeed, when exposed to cold, become torpid, and revive upon the restoration of a suitable temperature; but there are others, as the honey bee, which resist any reduction of their temperature below their ordinary digestive heat, and preserve it in their dwellings, even during the winter season. John Hunter found a hive in July 18, at 82°, when the temperature of the air was only 54°; and in December 30, at 73°, when the air was only 35°.—(*Phil. Trans.*) When cooled, until they become benumbed, they seldom recover, while the wasp, belonging to the same natural order, can be rendered torpid, and again revived with safety.

Why are entomological studies interesting and advantageous in a moral point of view?

Because the analogies derived from the transformation of insects admit of some beautiful applications, which have not been neglected by pious entomologists. The three states of the caterpillar, larva, and butterfly, have, since the time of the Greek poets, been applied to typify the human being; its terrestrial form, apparent death, and ultimate celestial destination: and it seems more extraordinary, that a sordid and crawling worm, should become a beautiful and active fly; that an inhabitant of the dark and fetid dunghill, should in an instant entirely change its form, rise into the blue air, and enjoy the sunbeams,—than that a being, whose pursuits here have been after an undying name, and whose purest happiness has been derived from the acquisition of intellectual power and finite knowledge, should rise hereafter into a state of being, where immortality is no longer a name, and ascend to the source of Unbounded Power and Infinite Wisdom.—*Sir H. Davy—Salmonia.*

COLEOPTERA.

BEETLES.

Why are insects of this tribe so often eaten by fishes?

Because all such as are abundant in summer are frequently blown into the water, where they become easy prey. Thus, the brown beetle, or cockchaffer, the fern-fly, and the grey beetle, are devoured in great numbers. But there is hardly an insect that flies, including the wasp, the hornet, the bee, and the butterfly, that does not become at some time the prey of fishes. So voracious are the grubs of some beetles, that the younger ones, when so gorged with those they have devoured, as scarcely to be able to move without bursting, are said, by Kirby and Spence, "often to take advantage of the helpless inactivity into which the gluttony of their maturer comrades has thrown them, and from mere wantonness, it should seem, when in no need of other food, pierce and devour them."

Some beetles are, however, very abstemious. Thus, the rose-chaffer has been kept alive more than eight years, by being fed on crusts of bread soaked in water.

Why was the beetle so often introduced in the buildings of the ancient Egyptians?

Because it was, to all appearance, a highly sacred animal. In the Egyptian tombs, it is found in great variety: of basalt, verde antico, or other stones, and of baked clay. Some have hieroglyphics on them, which no doubt contain some particular prayers, or the commemoration of striking events in the life of the deceased. It is supposed, that the Egyptians hung the beetle to their necks when they went to war; but of this we have no clear proofs. Belzoni mentions a circumstance which, he thinks, will solve the doubt. The beetles are of such a peculiar form, that if they were among the ornaments of the warriors, they would be easily distinguished. He observed a solitary instance of this kind. There is a sitting figure in the tomb of Samethis, which he discovered in the valley below Bebau el Malook, that, by its splendid dress and ornaments, may be intended to represent a king. It has a square plate of basalt hung to its neck, with an obelisk in the centre, and a figure on each side of it. He believes the above plate to be the only one that was ever found of the king. It has the form of an Egyptian temple, and in the centre is an elevated beetle on a boat, guarded by two figures, one at each side; and, on the reverse of the beetle, is an inscription over a boat, on which are two other figures, exactly like the former. The plate has the holes by which it was hung to a chain or string. Belzoni found also other beetles, with human heads, which he had never seen before.

Why is the dung-beetle also called the dorr?

Because, in old times, *dorr* was a stupid, blundering fellow; and, *to dorr*, was to ding or trouble with noise; both meanings applicable to the heedless flight, and loud noise, made in all the transits of this dung beetle. Such is the conjecture of Mr. Knapp, in his *Journal of a Naturalist*, who also speaks of dung beetles, as clocks—"as the boys call them, a corruption, he thinks, from *cloax*, a vault, a creature from below, which might signify its subterranean residence." Or, burrowing in the filth and ordure, as it does, the epithet *clocca*, the offspring of a common shore, or jakes, would not have been insignificant of its origin and habits."

Why is the dorr beetle thought to counterfeit death to preserve its life?

Because when flying with an apparent fearlessness of harm, if touched, or interrupted, though in no way injured, it will immediately fall to the ground, generally prostrate on its back,—its limbs extended, stiff, and seemingly devoid of life, and suffering itself to be handled without manifesting any signs of animation. In time, finding no harm ensues, its resumes its former state.

The small gray beetle, so well-known for making pin-holes in old furniture, is, however, one of the most common instances of this habit; and when it does so, it equals, if it does not exceed, the heroic firmness of the American savages, in bearing torture. You may maim these death-counterfeiting insects, pull them limb from limb, and even roast them over a slow fire, without making them move a joint, or exhibit the slightest symptom of suffering pain.

Why is an abundance of the larvæ of the cockchaffer to be feared?

Because, while in this state, lasting four years, they feed on the roots of corn, &c. and have occasionally produced great scarcity. An instance of its ravages, as well as a specimen of notable folly on the part of the sufferers by its rapacity, occurred in 1479, when this insect was cited by a regular Monitorium before the Spiritual Court of Lausanne, who assigned it an advocate from Friburg; but, after an attentive hearing of both parties, and mature deliberation, concluded by placing it under a *ban.*

Why have insects of the sylph family been reputed to dig under dead mice and moles, and bury them, in order to feast on them more securely?

Because they feed on maggots and their pupæ; and in penetrating the ground in search of the last of these, they loosen the soil so much, that the dead animal sinks under the surface, by its own weight, or, if light, is elevated on a hillock.—*Fleming.*

Why is the tortoise-beetle so called?

Because it is of the form of a tortoise, the wing cases projecting all around as a covering for the legs.

Why is the diamond-beetle so called?

Because it is one of the most splendid insects: the gold and colours in the numerous pits marked in rows upon the wing coverings, giving it an inexpressibly fine appearance in a clear light, and particularly under a magnifying glass.

Why is the great water-beetle probably the most ferocious creature of the pool?

Because it has great muscular power, a thick and horny case over its body, eyes large enough to see all the creatures about it, and powerful mandibles to seize and reduce them to fragments. It riots the polyphemus of the pool; and having thinned its herd in one place, is supplied with wings to effect a removal to a fold better furnished. In the larva state, it is almost equally destructive: it swims admirably—its hinder legs are long and brawny—beside being aided by a fringe of hairs, so that they are powerful oars to propel the body with celerity and ease.—*Knapp.*

Why is the oil-beetle so called?

Because of the oily-looking fluid which oozes from it when seized or alarmed. Another beetle is popularly called bloody-nosed, from its ejecting a red fluid from its mouth when caught: it is a very slow walker, but has an admirable contrivance for taking hold of trailing plants, on which it feeds. This consists of cushions of slightly concave thick soft hair, which both adheres by its points, and also produces somewhat of a vacuum, which enables it to walk as easily with its head perpendicularly downwards as upwards.

Why is the stag-beetle so called?

Because the male has forceps on the head resembling the antlers of the stag.

Why has the rhinoceros-beetle grub been selected as a specimen of moulting?

Because it is not the external skin only that these grubs cast, like serpents; but the throat, and part of the stomach, and even the inward surface of the great gut change their skin at the same time. Yet this is not the whole of these wonders; for, at the same time, some hundreds of breathing pipes, within the body of the grub, cast also each its delicate and tender skin. —*Swammerdam.*

DERMESTES.

Why is a species of Dermestes so formidable to the pine forests of Germany?

Because it lodges in such numbers in the alburnum of the pine, that 80,000 of its larvæ have been counted in a tree of moderate size. This affection causes the tree to perish from the summit downwards, its leaves turn red, it loses its resin, and is rendered nearly unfit even for making charcoal, much less timber or firewood. This, or a similar insect, has destroyed some of the finest trees in St. James's and the Green Parks, London, although the cause was, for some time, totally unsuspected.—*Blumenbach.*

THE DEATH-WATCH.

Why is a certain insect called the Death-Watch?

Because of its clicking noise, chiefly in the latter end of spring, which may be considered analogous to the call of birds. This is caused by beating on hard substances with the shield or fore-part of its head. The general number of successive distinct strokes is from seven to nine, or eleven. These are given in pretty quick succession, and are repeated at uncertain intervals. In old houses, where the insects are numerous, they may be heard, if the weather be warm, almost every hour in the day. In beating, the insect raises itself upon its hinder legs, and, with the body somewhat inclined, beats its head, with great force and agility, against the place on which it stands. This insect, which is the real death-watch of the vulgar, must not be confounded with a minuter insect, not much unlike a louse, which makes a ticking noise like a watch; but, instead of beating at intervals, it continues its noise for a considerable length of time without intermission. This latter insect belongs to a very different tribe. It is usually found in old wood, decayed furniture, museums, and neglected books.* Phi-

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* Mr. Carpenter; mentioned at p. 223.

sophers and wits have written on the habits of this
sect. That grave and good man, Sir Thomas
rowne, who wrote a book on *Vulgar Errors*, remarks,
ith great seriousness, that the man "who could era-
icate this error from the minds of the people, might
revent the fearful passions of the heart, and many
ld sweats taking place in grandmothers and nurses."
axter, in his *World of Spirits*, observes: "There are
any things that ignorance causeth multitudes to take
r prodigies. I have had many discreet friends that
ve been affrighted with the noise called a Death-
atch; whereas, I have since, near three years ago,
t found, by trial, that it is a noise made upon paper
a little, nimble, running worm, just like a louse,
t whiter and quicker; and it is, most usually, behind
paper pasted to a wall, especially to wainscot; and
is rarely if ever met with but in the heat of sum-
er."—In the *British Apollo*, 1710, is the following
ery: "Why Death-Watches, Crickets, and Weasels
come more common against death than any other
ne? *A.* We look upon all such things as idle super-
tions; for, were any thing in them, bakers, brewers,
habitants of old houses, &c. were in a melancholy
ndition." Duncan Campbell, in his *Secret Memoirs*,
32, says, "How many people have I seen in the most
rrible palpitations, for months together, expecting
ery hour the approach of some calamity, only by a
tle worm, which breeds in old wainscot, &c. endea-
uring to eat its way out, makes a noise like the
ovement of a watch." Grose also tells us that "the
cking of a death-watch is an omen of the death of
me one in the house wherein it is heard." Swift,
the other hand, has let fly the shafts of satire, as
ll as furnished a charm to avert the omen, as fol-
ws:—

"A wood-worm,
That lies in old wood, like a hare in her form,
With teeth, or with claws, it will bite or will scratch;
And chambermaids christen this worm a Death-Watch,

Because, like a watch, it always cries click;
Then wo be to those in the house who are sick:
For, sure as a gun, they will give up the ghost,
If the maggot cries click, when it scratches the post.
But a kettle of scalding hot water injected,
Infallibly cures the timber affected;
The omen is broken, the danger is over,
The maggot will die, and the sick will recover."

What an amusing treatise could Swift have written on the dry-rot: his charm, in this instance, is even more effectual than the cauldron in *Macbeth*.

Gay, too, in a pastoral dirge, says:—

"The wether's bell,
Before the drooping flock, toll'd forth her knell;
The solemn death-watch click'd the hour she died."

WATER-FLEA.

Why is the water-flea so called?

Because his abode is in quiet, still water; though, in mild weather, we see him gamboling upon the surface of the sheltered pool, in his shining black jacket. Retiring in the autumn, and reposing all the winter in the mud at the bottom of the pond, he awakens in the spring, rises to the surface, and commences his summer sports. They associate in small parties of ten or a dozen, near the bank, where some little projection forms a bay, or renders the water particularly tranquil; and here they will encircle round each other without contention, each in his sphere, and with no apparent object, from morning until night, with great sprightliness and animation; and so lightly do they move on the fluid, as to form only some faint and transient circles on its surface.—*Knapp.*

LADY-BIRD.

Why is the lady-bird so beneficial to the gardener and husbandman?

Because all the species, both in the larva and the perfect state, feed exclusively on aphides, and never touch vegetable substances. The eggs are usually placed in a group of twenty or more upon a leaf, where aphides abound; and when the young are hatched, they find themselves in the midst of their prey.—*J. Rennie.*

This, as well as some species of Meloë, has been recommended as a remedy for the tooth-ache.—*Blumenbach.*

THE WEEVIL.

Why is the larvæ of the weevil prized in India?

Because it feeds on the pith of sago, and is eaten itself as a delicacy.

Why are weevils so destructive to wheat in granaries?

Because of their fecundity, and the extraordinary manner in which they are produced. Thus, the female perforates a grain of wheat or barley with the jaws placed at the end of her long proboscis, and deposits a single egg within it; and when the young grub is excluded from the egg, it thus finds provided a fit dwelling and a store of proper food. The parent insect thus deposits its eggs in five or six grains every day, for several successive days. In about seven days' time, the larva is excluded from the egg, and, after feeding its accustomed time, changes into the chrysalis within the grain, and, in about a fortnight afterwards, comes forth a perfect weevil. The parent insect, after depositing its eggs in situations where there would be a supply for the sustenance of its offspring, does not die, but, according to Leuwenhoek, they live throughout the summer and winter; and they feed voraciously on the interior of the grain, both in the larva and perfect insect state. Kirby states, that a single pair of these insects may, in one year, produce above 6,000 descendants.

Why is it recommended to establish a colony of ants near a granary attacked as above?

Because the ants being continually engaged in searching for food, would soon find their way into the interior of the granary, and feed upon the larvæ of the weevils.

THE GLOW-WORM.

Why do the females of the glow-worm occasionally conceal or eclipse their light?

Because they may secure themselves from becoming the prey of the nightingale or other nocturnal birds. Mr. White, indeed, thought that they regularly extinguished their torch between the hours of eleven and twelve. The light of the glow-worm may perhaps, occasionally deter its insect enemies from making an attack on it, as the wolf and other ravenous beasts of prey are deterred from making an approach on travellers by night, when encircled by fire.—*John Murray.*

Why has not the male glow-worm upward or side vision?

Because the head is margined with a horny band, or plate, under which the eyes are situate. This prevents all upward vision; and blinds, or winkers, are so fixed at the sides of his eyes, as greatly to impede the view of all lateral objects. The chief end of this creature in his nightly peregrinations, is to seek his mate, always beneath him on the earth; and hence his apparatus appears designed to facilitate his search, confining his view entirely to what is before him or beneath him. The first serves to direct his flight, the others present the object of his pursuit: and, as we commonly, and with advantage, place our hand over the brow, to obstruct the rays of light falling from above, which enables us to see clearer an object on the ground, so must the projecting hood of this creature converge the visual rays to a point beneath. *Knapp.*

Why does the female glow-worm shine more vividly than the male?

Because, this distinction being especially noticeable

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at the season of love, it is probable that the light serves the purpose of directing the male to her. Some time after the female has laid her eggs, which also shine in the dark, this light disappears in both sexes.—*Blumenbach.*

This theory of the light of the glow-worm has, it is feared, more poetical prettiness than truth. Mr. Rennie, (whose observant genius has raised him to the Professorship of Natural History, in King's College, London,) has lately communicated such facts to the *Journal of the Royal Institution*, as must convince the reader of the fallacy of the above. Unfortunately, the grubs,—which being in a state of infancy, are therefore incapable of propagating—exhibit a no less brilliant light than the perfect insect. De Geer says the light of the grub was paler. He also remarked the same light in the nymph state, which he describes as "very lively and brilliant;" and in this stage of existence it is still less capable of propagating than in that of larva. "Of what use then," he asks, "is the light displayed by the glow-worm? It must serve some purpose yet unknown. The authors who have spoken of the male glow-worms say positively that they shine in the dark as well as the females."

We must devote a page or two to the economy of this very interesting creature, which every body knows by name, but comparatively few have seen. A correspondent of the *Philosophical Magazine* describes it as follows: "The female deposits her eggs in the month of June or July, among moss, grass, &c. These eggs are of a yellow colour, and emit light. After remaining about five or six weeks, the larvæ break their shells and make their appearance; at first they appear white, and are very small, but they soon increase in size, and their colour changes to a dark brown, or nearly black. The body of the larva is formed of eleven rings. It has six feet, and two rows of reddish spots down the back. It emits light in the dark; this light arises from the last ring of its body under the tail, and appears like two brilliant spots when attentively examined. The larvæ are seen creeping about and shining during the fine nights of autumn, and the light they emit is to direct them to their food. They feed on small snails, the carcasses of insects, &c. They frequently cast off their skins: after the expiration of about one year and nine months from their birth, they arrive at their perfect size. They then cease to eat, cast off their skin, and assume another appearance. The form of the perfect insect may be discovered through a thin skin that covers them. After remaining in this state two or three weeks, (scarcely ever moving,) they throw off their last skin, and arrive at perfection. The male then appears a perfect beetle, with wings and cover, to the same. The female, on the contrary, has neither wings, nor wing-cases; she is larger than the male, and of a lighter colour. It is the female that principally shines in a perfect state. Her light is far superior to that emitted by the larvæ, and arises from the three last rings of the body on the lower side."* Numerous opinions have obtained on the proximate cause or source of this curious illumination; and several experiments and observations to determine this point will be found collected in a small volume of *Experimental Researches*, by John Murray, F.S.A. F.L.S., &c. We have not space for the details, but quote the corollaries deduced from them by this ingenious observer:

1. Light, as connected with the glow-worm, is a subtle, evanescent principle, perhaps connected with a peculiar organized structure, or attached to a substance circumfused round the vitellula of the ovum, or integrating with it; unsupported by any chemical action, and confinable by the transparent film, or capsule, which imprisons it. 2. This light is perma-

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*Phil. Mag. vol. lviii, p. 53.

nent, and independent of any power possessed by the insect over it, except in so far as it can withdraw the luminious matter from the window, or transparent medium, through which it is discerned, burying it in the interstitial matter, or secreting it under an opaque shell. 3. The light is not connected with any of the functions of animal life as to its support or continuance, as with the spiracula, or breathing apparatus, and even the extinction of life itself does not extinguish the power and property of emitting light. 4. The luminous matter is not adherent exteriorly, but included in a capsule, which preserves it from extrinsic agency and contingency. 5. The light seems connected with peculiar organization, which elevated temperatures destroy, perhaps by decomposition, but which low temperatures only suspend temporarily. This very suspension, indeed, by cold, and restoration by warmth, and by a temperature equal to that of animal heat, goes far to prove a peculiar function, *inherent in the capsule*, and capable of educing and sustaining the phenomenon." Mr. Murray thus concludes: "The use to which it is subservient in the animal economy, it is difficult to ascertain—'we see but in part.' Its very existence, however, proves that it is a condition indispensable to its being. Providence has tipt the insect with living fire—a non-material ignition—burning, yet not consumed—even extinguished by a temperature which the animal system, with which it is so singularly interwoven, cannot withstand. It may be a 'lamp to its path,' to guide it to its food, subserving the additional purpose of warding off its enemies—while it may also be the luminous point that directs the nightingale to its proper prey."

Why is the larva of the glow-worm proverbial for its cleanliness?

Because it has an instrument at the tail consisting of white cartilaginous rays, disposed in a circle, one row within another, and retractile similar to the horns of a snail, which the insect employs for cleansing itself. This contrivance operates by suction, and not as a comb, brush, or wiper, and is furnished with a sort of funnel-shaped pocket, formed by the converging rays, into which are collected dust, &c. from the body, and the accumulated pellet is then extruded, and carefully placed where it might be out of the way of again soiling the glossy skin of the insect. This skin is of a soft leathery appearance; exhibiting, when magnified, a minute delicate dotting, similar to shagreen. The instrument being expanded over this shagreened surface, is drawn out with an evident effort, in the same way as boys draw the moist leather suckers, when they amuse them in dragging stones after them. All dust, &c. is then detached from the skin, and by a peculiar movement of the retractile rays, is lodged in the funnel-shaped pocket. This instrument also assists the animal to walk, and particularly to maintain a position against gravity, which its feet are ill calculated to effect.—*Mr. Rennie, in Journ. Royal Instit.* (*abridged.*)

Why is the lampyris, or fire-fly, so highly prized in India?

Because the Indians believe them to be the spirits of their departed ancestors. Sir James E. Smith informs us that the beaux of Italy sometimes adorn the head-dresses of the belles with these "stars of the earth and diamonds of the night." Mr. Murray also says, "I remember, one fine night, on coming from Arquà (once the residence of Petrarch) to Padua, that the whole trees and hedges, to the very summit, were illuminated with myriads of these living diamonds—the effect was magically magnificent."

Why is the baya bird of India supposed to light his nest with fire flies?

Because he catches the flies at night, and confines them with moist clay or cow dung. Bishop Heber says, "as the light of the flies could be of little use to the baya, it seems probable that he only feeds on them."

THE SKIPPER.

Why is the skipper so called?

Because of the singular dexterity with which, when lying on its back, it throws itself into the air, and falls on its feet.

Why is the light of the skipper superior to that of the glow-worm?

Because it is emitted from two protuberant, transparent, or windowed tubercles attached to its thorax, besides which there are two luminous spots beneath the elytra, only visible, of course, when it is on wing, and they are elevated: it then appears studded with four rich and vivid gems of a golden, blue lustre. In fact, the whole body seems a flood of pure light. In the West Indies, the natives employ these living fires to give light in managing their household concerns. In travelling, they are wont to attach one to each toe; and it is stated that in fishing and hunting they require no other illumination.—*J. Murray.*

THE EARWIG.

Why is the earwig so called?

Because of its supposed predilection for entering the human ear. Whether or not they ever did enter the human ear is doubtful,—that they might endeavour to do so, under the influence of fear, is more than probable; and this, perhaps, has been the origin of their name, and the universal prejudice against them. As it is said that anatomists deny the possibility of their deep or dangerous entrance into the ear, it is a pity that this is not generally known, as it might defend the constitutionally timid from unnecessary alarm.—*Brande's Journal.*

Earwigs, spiders, bees, and wood-lice, are amongst the few of the insect tribes which pay attention either to their eggs or offspring.

HEMIPTERA.

THE MANTIS.

Why are certain insects termed walking leaves?

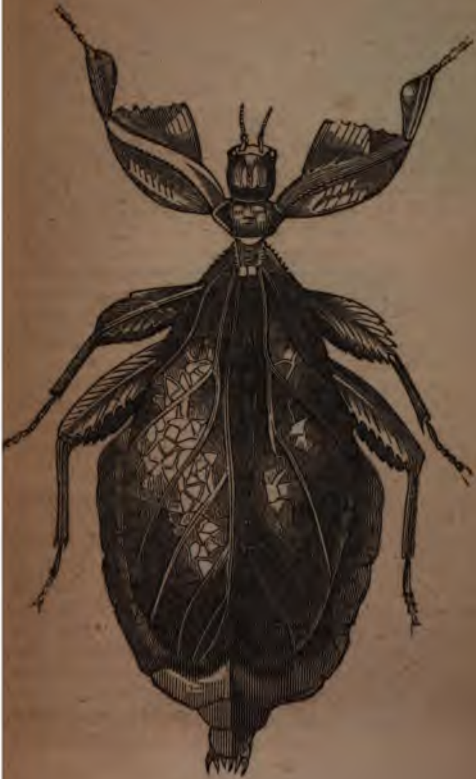
Because their wing-cases, not only in colour, but in texture, and even in veining, are so exactly like leaves, from the fresh green of those newly expanded, to the faded brown of those withered and fallen, that botanists themselves might be deceived, if they were detached from the insects, and exhibited as real leaves. Among locusts alone we find the various species with wing-cases resembling, in this manner, the leaves of the laurel, the myrtle, the citron, the lily, the sage, the olive, the camellia, thyme, and grass. The spectres, on the other hand, resemble the small branches of trees with their spray; and so minutely detailed is this mimicry, that the very snags and knobs, as Kirby and Spence remark, are accurately imitated. The caterpillar of the swallow-tail moth also resembles a walking branch, the ringed bulgings of the body being precisely like those of an elder branch, while the longitudinal stripes are like the cracks in the bark.

The mantis of this tribe is found in China and South America, and in the latter country many of the Indians believe that mantes grow on trees like leaves, and that having arrived at maturity, they loosen themselves, and crawl or fly away.

Why is this species also called the religious or praying mantis?

Because it is of slender shape, and in its sitting posture holds up the two fore-legs slightly bent, as if in an attitude of prayer; whence vulgar superstition has held it as a sacred insect; and a popular notion has prevailed, that a child or a traveller having lost his way, would be safely directed, by observing the quarter to which the animal pointed, when taken into the hand.

According to the latest classification, mantes have been divided into the two families of the mantida and



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phasmida, founded on a difference in the structure of the foot or leg; this member, in the former, being raptorious, is provided with a sharp claw, and a hollow on the leg and thigh, and a double series of spurs, for the better securing its prey; and in the latter, being destitute of any such peculiarity. One of the species, (*gongylodes*) when alive and fresh, resembles a blade of grass, differing in colour according to the season, being green and succulent in the rains, and in dry weather so much like a withered straw, that it can with difficulty be distinguished. They are very ferocious, and in China the fighting mantis forms as much the favourite amusement of boys, who carry them about in cages for the purpose, as cock-fighting in England.—*Trans. Asiatic Soc. Calcutta*,

THE CRICKET.

Why do we use the simile, "merry as a cricket?"

Because, quitting its summer abode, about the end of August, and fixing its residence by the fireside of kitchens or cottages, the cricket is as merry at Christmas, as other insects in the dog-days.

Herrick, among the pleasures of a country life, quaintly sings to his brother,—

> Yet can thy roof maintain a quire,
> Of singing crickets by thy fire;
> And the brisk mouse may feast herself with crumbs,
> Till that the green-eyed kitling comes.

The grasshopper and cricket race effect their well-known and often wearisome chirpings by grating their spiny thighs against their rigid wings.

LOCUSTS,

Why are locusts the scourge of oriental countries?

Because their devastations are so formidable, as sometimes to cause general scarcity and famine. They have likewise swarmed in Europe. In 1748 they appeared, but did not propagate, in England. In 1650, a cloud of locusts entered Russia, and afterwards spread over Poland and Lithuania, so as to darken the air and cover the earth, when dead, in some places, to the depth of four feet; the trees bent with their weight. In the year 591, an army of unusually large locusts ravaged Italy, and being at last cast into the sea, (as seems for the most part to be their fate) a pestilence, it is alleged, arose from their stench, which carried off nearly a million of men and beasts. In the Venetian territory, likewise, in 1478, more than 30,000 persons are said to have perished in a famine chiefly occasioned by the depredations of locusts.

Why are these insects called the locusts of scripture?

Because they are the species so accurately described in the Bible. Thus, in Joel ii. 2, &c. "A fire devoureth before them, and behind them a flame burneth: the land is as the garden of Eden before them, and behind them a desolate wilderness: yea, and nothing shall escape them. The sound of their wings is as the sound of chariots, of many horses running to battle; on the tops of the mountains shall they leap, like the noise of a flame of fire that devoureth stubble, as a strong people set in battle array. Before their faces the people shall be much pained; all faces shall gather blackness. They shall run like mighty men; they shall climb the wall like men of war; and they shall march every one in his ways, and they shall not break their ranks; neither shall one thrust another."

Why has so much controversy arisen on "locusts and wild honey," the food of John the Baptist, in the wilderness?

Because the commentators have interpreted the former as the fruit of the cassia-fistula, or locust-tree, resembling tamarinds; and other substitutes. Dr. Clarke, the traveller, was one of the first to propagate this misconception. There is, however, no doubt of the insects being the food, since Hasselquist mentions locusts being eaten by the Arabs, so that probably this dish was used in the time of St. John. Mr. Forbes, the Oriental traveller, corroborates this account, and adds, "The wild honey is found in the clefts of the rocks of Judea, as abundantly as in the caves of Hindustan."

THE LANTERN FLY.

Why is the lantern fly so called?

Because it emits a strong light from a horny bladder on the head, almost as large as the whole body, so that the natives of Guinea use them as lanterns. The light, according to Mad. Merian, is sufficient to read a newspaper by.

THE FROTH WORM.

Why is white froth so frequently seen in summer on willows, rose-trees, grass, &c.?

Because it is thrown up by the larva of the cuckoo-spit frog-hopper, as a protection from the sun, the creature being exceedingly soft. The name of "cuckoospit" is therefore a popular mistake.

APHIDES.

Why do aphides or plant lice increase so rapidly?

Because one impregnation not only renders fertile the eggs of the individual, but the animals produced from these, and the eggs of these again, unto the ninth generation.—*Philos. Transactions.*

Why are the aphides, so often seen on apple-trees, called white blight?

Because they are lodged upon the limbs of the trees in a hoary and cottony substance, beneath which these wingless creatures prey upon the tree by means of a beak terminating in a fine bristle; this being insinuated through the bark and the sappy part of the wood, enables the creature to extract, as with a syringe, the sweet vital liquor that circulates in the plant, till the tree perishes limb by limb. This insect produces its young alive, forming a cradle for them by discharging from the extremities of its body a quantity of long cottony matter, which becoming interwoven and entangled, prevents the young from falling to the earth, completely envelopes the parent and offspring, and serves as a vehicle for dispersing the wingless animal in tufts wafted by the winds from tree to tree throughout the whole orchard. When the long cottony vesture is removed, the insects are still enveloped in a fine short downy clothing, to be seen by a magnifier, proceeding apparently from every suture or pore of their bodies, and protecting them in their dormant state from the moisture and frosts of our climate. Mr. Knapp thinks the epithet, ‘American blight,’ may be correctly applied to this insect, but we have no sufficient authority to conclude that we derived the pest from that country.

Why are aphides never seen in the flower of the rose, although they infest the stalk leaves?

Because of the odour of the flower.

Why are the larvæ of lace-winged flies called the lions of aphides?

Because they devour the latter with great voracity, sucking the juices of their victims with their crescent-shaped and hollow mandibles.

The transparent wings of some insects are so attenuated in their structure, that 50,000 of them, placed over each other, would not form a pile a quarter of an inch in height.

KERMES AND LAC.

Why is the kermes so highly prized?

Because, in the south of Europe, where it is found, on holly, carmine is prepared by sprinkling vinegar on the berry or gall-shaped nests of this animal's eggs.

Why is gum-lac so called?

Because it is the produce of the lac-insect, on the hilly parts of Hindostan. Blumenbach says, “a whit wax-like kind of lac has lately been found in Madras, the specimens of which, in my possession, consist of single cells, resembling coffee-berries in size and shape; it may prove very valuable in India, where bees'-wax is scarce." Although Blumenbach states this as a recent discovery, Dr. Pearson, in 1794, obtained from the same substance, or white lac, a peculiar acid, which he called laccic acid.

Lac appears designed to answer the purpose of defending the eggs of the insect from injury, and affording food for the maggot in a more advanced state.

COCHINEAL INSECT.

Why was the cochineal insect originally supposed to be a grain or seed?

Because, during the whole term of its life, it remains fixed to the spot where it first settled, and to the vegetable nipple of the nopal plant which feeds it.

Why are these insects propagated with such rapidity?

Because the nopal plant is inoculated with them, by being rubbed with a small portion of the young resembling blight, and, in proportion as the plant increases its leaves, it is sure to be covered with this costly parasite. When the plant is perfectly saturated, the cochineal is scraped off with great care. Plantations containing fifty or sixty thousand trees, growing in straight lines, may be seen in some districts of America. The quantity of insects annually exported from South America is valued at 500,000*l.* The Spanish Government are jealous of its being naturalized elsewhere, while a reward of 6,000*l.* is offered by the East India Company for its introduction into our territories.* Cochineal has been transplanted to Java and old Spain, with great success, and on the island of Malta. The wild species of cochineal, or kermes, was discovered about three years since among coffee plants and acacias in the Botanic Garden at Cambridge, where the gardeners called them "amelca bugs."

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* The duty on cochineal imported from British possessions is 2*d.* per lb., other places, 6*d.*, and the amount for the year 1827 was 4,162*l.* 13*s.* 11*d.*

Why are the female insects the most valuable?

Because they produce the best colour. They are in number to the males as three hundred to one. M. M. Pelletier and Caventon have lately found that their very remarkable colouring matter is mixed with a peculiar animal matter, like fat, and with different salts: they have obtained this colouring matter in great purity and called it *carminium.* Carmine is a triple compound of an animal matter, carminium, and an acid which enlivens the colour.

Why is fine cochineal of a gray colour, inclining to purple?

Because the gray is a powder which covers it naturally, a part of which it still retains; and the purple tinge proceeds from the colour extracted by the water in which it has been killed.

The important use of cochineal in producing a fine scarlet colour, is now well known. Long after its introduction, however, cochineal gave but a dull kind of crimson, till a chemist named Kuster, about the middle of the sixteenth century, discovered the use of the solution of tin, and the means of preparing with it and cochineal, a durable and beautiful scarlet. The immense consumption of cochineal in England is, in some measure, explained by the prevailing colour of our army clothing being scarlet.

LEPIDOPTERA.

BUTTERFLIES AND MOTHS.

Why do butterflies often fly circuitously?

Because one sex pursues through the air the track of the other.—Butterflies also migrate in immense

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swarms. M. Hubert relates the flight of a column of them in Switzerland, about four years since, the passage of which lasted upwards of two hours, and extended in breadth from ten to fifteen feet. He also describes their flight as low, rapid, and equal.

Why are butterflies believed to explain the showers of blood recorded by superstitious historians?

Because many of these insects when evolved from the pupa state, void a red-coloured matter resembling blood. Mouffet tells us, from Sleidan, that in the year 1553, a prodigious multitude of butterflies swarmed throughout a great portion of Germany, and sprinkled plants, leaves, buildings, clothes, and men, with bloody drops, as if it had rained blood. Several historians, indeed, have recorded showers of blood among the prodigies which have struck nations with terror, as the supposed omen of the destruction of cities and the overthrow of empires. The error was first detected by M. Peiresc, a philosopher, of Aix, who, at the time of a rumoured shower of blood, happened to have a large chrysalis in a box, which, changing into a butterfly, left a red stain of the same nature with the drops of the shower popularly supposed to be blood.

Why is the humming-bird hawk-moth so called?

Because of its vigilance and animation, equal to the splendid meteoric bird of the tropics, and not on account of its resemblance in colour; since our plain and dusky insect has none of the glorious hues of the bird. The least movement alarms this moth; though Nature seems to have given it some essential requisites for its safety. Its activity, when on the wing, renders its capture difficult, and when it rests, it is on a wall, the bark of trees, &c.

Why is the Atropos moth so called?

Because of its origin from *Atropos*, the third Fate, it being a great destroyer of bees.

Why did Linnæus call the small tortoiseshell-butterfly "the deceptive herald of spring"?

Because there often appear, on fine days, individuals which have survived the winter.

Why is the atlas-moth so called?

Because of its immense wings, larger than those of a common bat; the body is, however, remarkably small.

In a Madras Journal, date 1829, we read of a person at Arracan who caught a moth which measured from the tip of one wing to the tip of the other, ten inches. Both wings are beautifully variegated with the brightest colours. The editor thinks this the largest moth on record, exceeding in dimensions the largest in the British Museum, which measures about nine inches from tip to tip.

Why is the goat-moth so called?

Because it emits a peculiarly subtle smell, which has been thought to resemble that of the goat. The object and seat of this odour seem not well understood. Some have conjectured it to proceed from the mouth, and discharged to soften the wood in which it burrows: the latter opinion is not, however, tenable, as many other insects that perforate timber, are not so supplied, and the microscope does not manifest the exudation of any fluid.

Why is the gamma-moth so called?

Because it has imprinted on its dark wings a white character, something like the letter Y, but more like the small Greek *gamma.*

Why is the large white-moth used by anglers callea the miller's fly?

Because of the mealy substance about its wings and body.

Why is the death's-head moth so called?

Because of the markings of its back being superstitiously associated with the head of a skeleton, with the limb-bones crossed beneath. In German-Poland, this moth is called the death's-head phantom, the wandering death-bird, &c. Its cry, produced by scratching its mandible against its horny chest, there becomes the voice of anguish, the moaning of a child, the signal of grief; it is regarded as the device of evil spirits, and the very shining of its eyes is thought to represent the fiery element whence it is supposed to have proceeded. Flying into the apartments of weak persons, in the evening, it at times extinguishes the light, foretelling war, pestilence, hunger, death—to man and beast.

Why is the ghost-moth so called?

Because of its singular flight in the twilight hour, haunting, as it were, one particular spot—wherefore the fancy of some collector probably considered it a spectre-like action.—*Knapp.*

Why is the ghost-moth distinguishable from all others by its continued flight over one spot?

Because it thus woos its mate, lying concealed in the herbage over which it sports.—*Knapp.*

Why is the male ghost-moth supposed to be destroyed in such numbers by nocturnal birds?

Because his white satiny wings are easily discerned in the twilight, and these wings are frequently found scattered about in our morning walks.

Why are the caterpillars of the swallow-tailed-moth called surveyors, loopers, and geometers?

Because of their peculiar manner of moving, which may readily be conceived by those who have not seen them, when we mention, that at the commencement of each step their bodies present a pretty exact figure of the Greek letter Ω. In this position, laying hold with their hinder prolegs, they stretch out their heads to the full extent of their body, laying hold with their fore-legs while they again bring forward their body into the shape Ω again.

THE SILKWORM.

Why does the silkworm spin a silky cocoon?

Because it may therein change from the caterpillar to the pupa state in greater safety. This cocoon it prepares from a gum or tenacious fluid contained in two pouches, placed along the back, beneath the stomach; which fluid it spins into very fine threads, by means of a particular tube placed behind the mouth. It is the middle portion of the cocoon, after removing the floss or loose silk on the exterior, which is used in our manufactories.

Why is the first preparation of silk to throw the cocoons into warm water?

Because it may dissolve any slight adhesions which may have occurred when the caterpillar was spinning.

Why is it evident that the insect spins the whole without interruption?

Because the cocoons may be generally unwound without breaking the thread. It is popularly supposed, however, that if the insect be disturbed during the operation by any sort of noise, it will take alarm, and break its thread; but Latreille says this is a vulgar error. The length of the unbroken thread in a cocoon varies from 600 to 1,000 feet; and as it is all spun double by the insect, it will amount to nearly two thousand feet of silk, the whole of which does not weigh above three grains and a half. Five pounds of silk from ten thousand cocoons is considerably above the usual average. When we consider, therefore, the enormous quantity of silk which is used at present, the number of worms in producing it will almost exceed our comprehension.

Why is it requisite to devote whole plantations of mulberry-trees to the culture of silkworms?

Because of the voracity of the animal,—a single caterpillar weighing, when first hatched, only the hundredth part of a grain—consuming, in thirty days, above an ounce of leaves; that is to say, it devours in vegetable substance about 60,000 times its primitive weight.

Count Dandolo, in his recent *Treatise on Silkworms*, thus estimates their progressive increase in weight:

	grains.
100 worms, just hatched, weigh about	1
After the first moulting	15
After the second moulting	94
After the third moulting	400
After the fourth moulting	1,628
On attaining their greatest size and weight	9,500

They have, therefore, in thirty days, increased 9,500 times their primitive weight. The length of the silkworm also increases about forty times in twenty-eight days. Again, the Count calculates that the quantity of leaves drawn from the tree employed for each ounce of eggs, amounts to 1,609 lb. 8 oz.

In France, the scorzonera, or *salsifis*, has been advantageously substituted for the mulberry in rearing silkworms. The silk produced is equal to that of the worms fed upon mulberry leaves, and surpasses that obtained from worms fed upon lettuce-leaves; in the latter case, the quantity has been doubled.

To prevent the jaundice common among silkworms, the Abbé Esseric, of Carpentras, used to powder them with quick-lime by means of a silk sieve; he then gave them mulberry-leaves moistened with a few drops of wine. It was at first supposed that the cocoons of silk were injured by this process; this, however is not the case, and his method is now adopted generally in the department of Vaucluse in the south of France.

Why has it been inferred that silk is a vegetable, not an animal product?

Because part of the interior of the white mulberry, upon which silkworms thrive best, is composed of a tissue of beautiful white silky fibres, much resembling China silk: hence, the basis of the material, in its proximate form, is derived from the vegetable kingdom, though the spinning of its substance into a lengthened thread is entirely due to the mechanical functions of the silkworm.

The growth of the silkworm has been tried, but with no great success, in this country. Evelyn computed that one mulberry-tree would feed as many silkworms annually as would produce seven pounds of silk. "According to that estimate," says Barham, (dated 1719,) "the two thousand trees already planted in Chelsea Park, (which take up one-third of it,) will make 14,000 lb. weight of silk; to be commonly worth twenty-shillings a pound, those trees must make £14,000 per annum."

Why do silkworms in warm climates consume a rather less quantity of leaves?

Because the leaves are supposed to be more nutritive; but, in that case, the silk produced is not so delicate and fine.

Of the kind and size of the silkworm also is the Sustillo, a caterpillar bred in the pacae, a tree well known in Peru. When completely satiated with the leaves, it spins a *fine silk paper*, which has been gathered measuring a yard and a half in length. In proportion to the vigour and majestic growth of this tree is the number of insects it nourishes.

Why is silk manufacture one of the most important of commercial resources?

Because the labour in preparing new silk affords much more employment to the country producing it, than any other raw material. The fact has been established before a committee of both Houses of Parliament. We may add, that the raw silk imported into England, from all parts of the world, in 1814, amounted to one million six hundred and thirty-four thousand, five hundred and one pounds; and in 1824, to three millions, three hundred and eighty-two thousand, three hundred and fifty-seven. The official values of these imports are £703,009, and £1,464,994.

Why was the manufacture of silk, in ancient times, confined to the East Indies and China?

Because the insects that produced it were indigenous to those countries. It was thence brought to Europe in small quantities, and in early times sold at so extravagant a price, that it was deemed too expensive even for royalty.

Why were silk-dresses prohibited by Mahomedans?

Because they considered silk unclean, from its being produced by a worm. Hence it was decided that a person wearing a garment made entirely of silk, could not lawfully offer up the daily prayers enjoined by the Koran.—*Herbelot.*

The history and economy of the silkworm would occupy some score pages, but these few facts are the latest illustrations.

Why are the eggs of some insects found strongly cemented round the twig of a leafless tree?

Because they may there survive the winter, and be hatched in spring; the living principle, though not in a state of activity, being capable, as it would appear, of withstanding severe cold.

Why do these caterpillars hang by a thread of silk from the branches of trees, with their head downwards?

Because they may be always ready to drop down in safety, by extending this thread, on the sudden approach of their enemies.

THE COSSUS.

Why is the cossus so destructive to the trees on which it lives?

Because it exists as a caterpillar three years previous to its changing into the pupa state. It is so tenacious of life, that it will remain in an artificial vacuum for hours together, without being injured; and under water for almost three weeks in the middle of summer. It is remarkable also, that the pupa has the power of locomotion, and when the time of its change approaches, can bore its way from the middle of the tree to the bark.—*Blumenbach.*

Why has the caterpillar of the cossus been stated by entomologists as a specimen of the muscular strength of insects?

Because it contains more than seven times as many muscles as the human body, being 4061. Lyonnet has ably illustrated the anatomy of this extraordinary creature. Mr. Rennie put one of these caterpillars under a bell-glass, which weighed nearly half-a-pound, and upwards of ten times the weight of the insect, yet it raised it up with the utmost ease. He then placed on the glass a thick book, weighing four pounds, and the animal again raised the glass, though loaded with the book, nearly a hundred times its own weight, and made good its exit. It should, however, be mentioned, first, that the wedge-like form of the caterpillar's head, in connexion with the peculiar shape of the glass, enabled it to lift it; and, secondly, that one side of the glass resting on the table, the insect only bore half the weight of the glass and book.—*Insect Transformations.*

NEUROPTERA.

THE DRAGON-FLY.

Why are the larger dragon-flies usually called horse-stingers?

Because they are supposed to have a propensity to sting horses, and (it may be presumed) any other animal which may irritate them. But, *not one of the tribe is furnished with a sting*. They have, however, a pair of most formidable looking jaws, though even these are not strong enough to inflict injury upon any of the larger animals, and are only employed to crush a fly, or to wing a moth or a butterfly.

We may here mention that the larvæ of the dragon-fly are provided with an apparatus probably unmatched in the insect world. This consists of a *mask*, or the under lip of the larva, which conceals the mouth and face, and two plates covering the jaws. While this strange organ is at rest, it applies close to and covers the face. When the insects would use it, they unfold it like an arm, catch their prey by means of the plates, which are toothed like jaws, and then partly refold the lip, so as to hold the prey to the mouth. De Geer observes, the larvæ of the dragon-fly do not, however, trust to this *mask* alone, for surprising their prey, but steal upon it, as a cat does upon a bird, very slowly, and as if they counted their steps; and then, by suddenly *unmasking*, seize it by surprise: so artful are they, that insects, and even small fishes, find it difficult to elude their attacks.

Why do the larvæ of dragon-flies suck in and eject water to aid their progress in swimming?

Because the jet propels the creature through the water, in consequence of its being resisted by the stationary mass of the fluid behind it, and a contrary current being thence produced by this singular pumping. As the insect, between every stroke of the internal piston, is obliged to draw in a fresh supply of water, an interval consequently occurs between the strokes, during which it will sometimes elevate its tail above water, and squirt out a small stream like that from a little syringe. Among other purposes of this wonderful apparatus are its aid in bringing small water insects within its reach, and its share in respiration, in which it somewhat resembles the gills of fish.

THE DAY-FLY.

Why is the ephemera or day-fly so called?

Because it lives but a very short time in its perfect state; often only for a few hours. Day-flies live in water some years as larvæ. After that time, in many

places, millions of the perfectl
their appearance from the wat
the middle of summer; they
what happens to other insects,
Blumenbach.

Why are water-flies less abu
Because of the diminution
and the cultivation of the coun
Sir H. Davy, in his *Salmonia,*
marshes which fed considerabl
and the consequence is, that t
be affected by severe drought
first killing, and the second w
and aurelias. May-flies, thirty
abundant in the upper part of
refordshire, where it receives th
seldom or rarely seen; and m
part of England, as well as t
the exception of those that rise i
parts of Dartmoor and Exmo
unfordable torrents, and in dr
than scanty rills."

THE CADDI

Why does the caddis-worm,
moth, encase itself with shells, s
Because its form is but little
its long body, encumbered with
heavier than water, the eleme
seek its food; and it thus atta
dies, to counterpoise its own
enable it to swim on the surfa
the bottom of the water. Th
and singularity in the material
insects. When they want to
hollow and buoyant substanc
increased; in order to descen
substances are either diminish
an addition of heavy materials.

vel; the interior they line with a fine silk spun by themselves.

HEMOROBIUS.

Why does the hemorobius perla fasten its eggs to the leaves of trees, upon upright bristle-like points?

Because the aphis has previously laid its eggs upon these leaves, and the young aphides would destroy the above eggs, were they not thus kept out of their reach. As soon as the larvæ of the hemorobius appear, they crawl down the slender props upon which they rested, and commence devouring the aphides, wherefore the former are termed plant louse lions; and by thus thinning them, they are doubtless of great service in the general economy of nature.

ANT-LION.

Why is the ant-lion so called?

Because, when in its larva state, it digs, with its leg for a shovel, a funnel-shaped pit in the sand, and covers itself up to the neck, laying wait for and destroying the ants and other small insects, which, not perceiving it, come to the edge of the pit, and slip in over the loose sand. Like its prototype, the lion, it will not take a dead animal, however recently killed; and those insects who simulate death when danger is near, escape the fangs of the ant-lion.

HYMENOPTERA.

GALL INSECTS.

Why are "apples" produced on oak-trees?

Because the female gall-fly lays her eggs in the buds, which consequently swell, and the excrescences serve for the abode of the larva until it has completed its changes, and is in a state to issue from its prison; after which the apples often become the residence of various kinds of wasps.

Why are oak-apples filled with fibres in the direction of the stem?

Because the gall-fly has thus diverted the nervures of the leaves, which would have sprung from the bud in which the eggs were inserted, and actually do carry sap-vessels throughout the substance of the gall.—*Reaumur.*

Blumenbach says, that each egg grows in size after it has been deposited in the plant, and sometimes doubles its size before the larva issues from it.

The excrescences on the leaves of the rose-tree, the oak, the poplar, the willow, and other trees, are also formed by the gall-fly depositing its eggs there; The gall-nut used in making ink is similarly produced. Those on the currant-leaf are produced by aphides.

Why are cultivated figs ripened by being suspended beneath wild ones?

Because the wild figs are full of gall insects, which becoming winged, quit the same, and penetrate the cultivated ones to lay their eggs: the insects appear to ensure the fructification by dispersing the pollen, and afterwards to hasten the ripening by puncturing the pulp, and causing a dispersion or circulation of nutritious juices. This is called *caprification*, and in France is imitated by inserting straws dipped in olive oil.

THE ICHNEUMON FLY.

Why do ichneumon flies materially contribute to the destruction of caterpillars, spiders, &c.?

Because they lay their eggs in living caterpillars, which consequently become diseased, and die either before or after their change into pupæ.

Why do these flies preserve crops of wheat?

Because they destroy the wheat insects, and for this purpose may be found round the corn-ear all the day.

These flies appear of great self-denial and curious fancy; for they only lay an egg beside an egg of the wheat-fly, which is hatched along with it, devours it, and saves the wheat. The most abundant species of these ichneumons, or flies of prey, positively lays its eggs in the very body of the yellow maggot, while it is feeding busily. It has a long hollow rod, projected at pleasure from its tail, which it thrusts at pleasure into the body of the worm, and down which it then sends one egg from its body, which egg is hatched within the body of the maggot, and consumes it.—*Quarterly Journal of Agriculture.*

THE WASP.

Why are there usually two holes in the outer walls of a wasp's nest?

Because they may serve as the gates of the city; according to Reaumur, one of them is for ingress and the other for egress; and such is the order observed, that the uses of the respective doors are rarely if ever changed. The cells of the nest or vespiary, are solely constructed to lodge the young, and on an average a nest may contain about 16,000 cells, which are filled thrice in each year.

Years productive of the plum are said to be congenial likewise to the wasp. A local rhyme will have it,

When the plum hangs on the tree,
Then the wasp you 're sure to see.

Why is the wasp supposed to seize flies rather in wantonness than for food?

Because it bears the fly about with it for a length of time, and drops it unconsumed.

Why is a wasp of Guadaloupe termed "vegetating?"

Because it is united to a living plant, so that when the insect attempts to rise from the nest, it falls to the ground, on account of the weight of the plant, which takes root on some part of the body, particularly on the breast-bone. It was long thought that these plants grew on insects deprived of life. M. Ricord has, however, determined otherwise, and has observed that the larvæ in the cells also have this vegetating appendage, but then it is very small.—*Journal de Pharmacie.*

THE HORNET.

Why is the hornet so fatal to wasps?

Because it not only seizes the wasps while feeding, but hawks after them when on the wing. Having captured them, the first operation is to snip off the head, then to cut away the lower part by the waist. Sometimes you may hear the hornet shearing away the outer coat from a wasp's body, and crushing it with its strong mandibles; sometimes devouring it, but generally only sucking the juices it contains.

Why are hornets supposed to fall victims to each other's voracity towards the end of autumn?

Because they fight desperately when they meet in pursuit of prey, biting each other's body, and trying to get their mandibles under the head of their opponents, to snip it off. Pairs of them often die after such a contest.

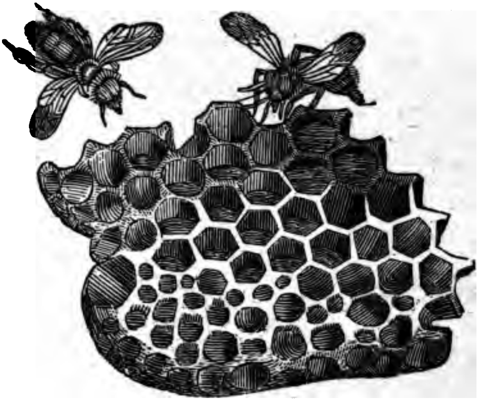
BEES.

Why are bees the most persecuted of insects?

Because every living thing, from man down to an ephemeral insect, pursues the bee to its destruction for the sake of the honey that is deposited in its cell, or secreted in its honey-bag. To obtain that which the bee is carrying to its hive, numerous birds and insects are on the watch, and an incredible number of bees fall victims, in consequence, to their enemies. Independently of this, there are the changes in the weather, such as high winds, sudden showers, hot sunshine; and then there is the liability to fall into rivers, besides a hundred other dangers to which bees are exposed.

The average number of a hive, or swarm, is from fifteen to twenty thousand. Nineteen thousand four hundred and ninety-nine are neuters or working bees, five hundred are drones, and the remaining *one* is the queen or mother!

Why are the antennæ of bees supposed to be their organs of touch?



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Because these organs alone enable the bee to work in the darkness of the hive.

Why are "hummings in the air" sometimes heard in sultry weather?

Because a collection of bees, or some such insects, are high in the air, although the musicians are invisible. Mr. Knapp describes these as "the humming of apparently a large swarm of bees."

Why do bees build in hives?

Because they have been thus domesticated by the ingenuity of man. In the wild state they build in hollow trees, under ground, &c.

Why does honey differ from wax?

Because honey is a simple substance, extracted by bees from the flower; whereas, wax is a secretion found in scales under their belly. The wax-workers, having gorged themselves with the nectar of flowers, hang motionless in festoons in the hive; and in twenty-four hours, scales of a white matter, like talc, are formed under the ring of the abdomen. The wild honey of Palestine has already been noticed at page 254.

Why is the stomach of the bee called the honey-bag?

Because in it the nectar of the flowers is elaborated and converted into honey. The animal vomits it up from this reservoir, and deposits it in the hive.

Why does the quality of honey vary in different hives?

Because the sense of taste in bees is so unrefined, that it matters little to what neighbourhood some go to gather honey, or from what flower. Dr. Barton, in the *American Philosophical Transactions*, enumerates such plants as yield a poisonous syrup, of which bees partake without injury, but which has been fatal to man.

Why are bees so fond of the peach-tree?

Because they not only drink the nectar, and abstract the pollen of the flower, but they appropriate the peach itself. An American writer says, "we have seen twenty or thirty bees devour a peach in half-an hour; that is, they carried the juices of it to their cells."

Why is it improbable that bees are affected by the hiving-pan, or a tin-kettle?

Because their sense of hearing is very obtuse. Huber says, that "thunder, or the report of a gun, has little or no effect upon them. Sounds are, however, made by the flapping of the wings and other movements of the body, which are distinctly heard and understood by bees. Their sense of smelling is, doubtless, acute."

Why do bees build their cells of a six-sided form?

Because it is one of the only three figures by which a space can be filled with cells, without leaving any space between them; and is the most convenient and the strongest, except the circle, by which some room would be lost. By the six-sided form, therefore, the bees save both space and materials.

Why do the walls of bee-combs appear double and treble?

Because the larvæ are not content with the cells as a covering during the pupa state, but they line their sides and bottom, and cover their mouth with silk, thus making a complete cocoon. These, after the insect has been perfected, are left in the cell, and when it contains another larva, a second lining is prepared. Each lining at the bottom, in the bee, covers the excrement, which the animal had produced in its larva state. John Hunter, by whom the above appearance was observed, has counted twenty different linings in one cell.

Why are certain bees called carpenters and masons?

Because the former work in wood, as the latter do in bricks, &c.

The mason builds its nest with wonderful art and strength, of the sand and mortar of old walls exposed to the sun.

Within this are chambers lined with leaves, and containing one egg, which, becoming a maggot, lives on the store provided by the mother, changes to a chrysalis, and comes forth a perfect insect in the following spring.

Why are others called upholsterers?

Because they construct their abodes by cutting off portions of the leaves or bark of plants, and uniting them with silk, &c. Even the most elaborate skill of art and luxury cannot excel the embellishments of the cells of these bees. The rose-leaf-cutters are of this species.

Why are others called tapestry-bees?

Because their exclusive business is to adorn the chambers with tapestries of the leaves of flowers, as the poppy, which affords a splendid scarlet hanging equal to the most superb damask.

Why are carder-bees so called?

Because they *card* or prepare moss as wool for their nests.

Why do bees rest in clusters or festoons?

Because four or five cling to a part of the hive, and extend their hind-legs, whence others suspend themselves by their fore-feet, and so on for other lines.

Why is it whimsical to save bees when their honey is taken?

Because they must be fed; and if saved, they will die of old age before the next fall; and though young ones will supply the place of the dead, this is nothing like a good swarm put up during the summer.

This is Mr. Cobbett's opinion. If saving the bees be whimsical, it is harmless; and it is better to be whimsical than cruel.

Why is it important to unite hives of bees for keeping?

Because it has been ascertained that when two or three distinct hives are united in autumn, they consume together scarcely more honey during the winter than each of them would have consumed singly, if left separate.—*Bee Preserver, translated from the German.*

Why is it evident that all the operations of a swarm of bees are dictated by previous concert and the most systematic arrangement?

Because of their precaution in reconnoitring the situation where they intend to establish their new colony or swarm from the parent hive. The bees do not go out in a considerable body, but they succeed each other in going and returning, until the whole of the swarm have apparently made good the survey, after which the whole body depart in a mass. If, by any chance, a large portion of a swarm take their departure without the queen-bee, they never proceed to take up their ulterior quarters without her majesty's presence.

These interesting facts were lately observed and communicated to the Royal Society, by Mr. T. A. Knight, president of the Horticultural Society.

Why should all bee-stocks be examined before the approach of winter?

Because the gnats or maggots form a chrysalis so strong in the hive, that the bees cannot displace them, and in the spring they creep out of their little sepulchres, and spin a thin web before them, as they march up into the hive among the combs; the bees, endeavouring to dislodge them, are entangled in the web, and there die; and thus, for the want of a little trouble, many stocks are destroyed.

Why should the thatch cap on a beehive be changed often?

Because the straw soon begins to get rotten; then insects breed in it, its smell is bad, and its effect on the bees is dangerous.

Why do bees, when they swarm, fly towards trees?

Because they like the pure air of the higher regions better than the air enclosed in hives, which receive the exhalations of the earth, and in which contagious diseases make great ravages. Thus, in Livonia, bees are cultivated in forests, and are never known to swarm towards the gardens.

Why is the best situation of a bee-house a little to the west of the south?

Because the sun, shining into the mouth of the hive too early, calls the bee abroad before the cold steam is exhaled from the flowers, and the vernal juice turned into honey; but, in the above situation, the sun will reach the front of the house about nine o'clock.

Why are bevering moths so fatal to bees?

Because they lay their eggs at the mouth of the hive, and, with the wind of their wings, fan them within the hive, where the warmth of the bees hatches them to their own ruin.

Why is it disadvantageous to rub the inside of a hive with herbs, &c. previous to the swarm being put in?

Because it gives much unnecessary labour to the bees, as they will be compelled to remove every particle of foreign matter from the hive before they begin to work. The vile practice of making an astounding noise with tin pans, or kettles, when the bees are swarming, is also utterly useless. It may have originated in some ancient superstition, or it may have been the signal to call aid from the fields to assist in the hiving. If harmless, it is unnecessary; and every thing that tends to encumber the managment of bees, should be avoided.—*American Work.*

Why do weak-minded persons inform bees of any death that takes place in a family?

Because the disastrous consequence to be apprehended from non-compliance with this strange custom, is, that the bees will dwindle and die. The manner of communicating the intelligence to the little community, with due form and ceremony, is this: to take the key of the house, and knock with it three times against the hive, telling the inmates, at the same time, that their master or mistress, &c. (as the case may be) is dead! Mr. Loudon says, when in Bedfordshire, lately, we were informed of an old man who sang a psalm the previous year in front of some hives which were not doing well, but which, he said, would thrive in consequence of that ceremony.

ANTS.

Why is the alleged providence of ants more valuable as a moral lesson than for its fidelity to nature?

Because, so far from ants storing up corn for winter provision, no species of them even eat grain, or feed in the winter upon any thing. Again, wood-ants, when within reach of a corn-field, often pick up grains of wheat, barley, or oats, and carry them to the nest as building materials, and not for food, as was believed by the ancients, who also mistook their eggs, larvæ, and pupæ for hoarded grain. Such is the care with which they guard and attend their pupæ, that a working ant has been known to drag ten pupæ into a place of security, after the posterior of its body had been cut off.—*Blumenbach.*

Mr. Carpenter happening once to beat down a number of aphides out of a stunted oak-tree, at the foot of which there was an ant's nest, soon afterwards saw the ants carrying up the aphides, and carefully replacing them upon the leaves of the tree.

Why are the working ants so called?

Because they make, defend, and repair their dwellings, provide their food, watch and attend to the female, and take care of her eggs; they likewise acquire and defend aphides and cocci, which bear to them the same relation that cattle do to man, and which are fed by them with so much care, and the milk of which forms so important a part of their food; they also make predatory excursions to carry off pupæ, which they bring up as slaves.—*Sir H. Davy.*

Black or jet ants occasionally appear in incalculable swarms and singular form, like columns ascending and descending, twenty of which may sometimes be seen together, and at a distance appear almost like an Aurora Borealis.—*Blumenbach.*

Why are white ants so destructive to trees?

Because they are furnished with an acid for softening wood, the odour of which is extremely pungent. They prefer the wood nearest to the bark, which they are careful not to injure, as it affords them protection.—*Latreille.*

Why are the ravages of white ants much more fatal than apparent?

Because they hollow out wood with such nicety, that they leave the surface whole, after having eaten away the inside. A shelf or plank, thus attacked, looks solid to the eye, when, if weighed, it will not outbalance two sheets of pasteboard of the same dimensions. In this manner, too, they hollow out large decaying or fallen trees, leaving little more than the bark.

Why are the houses of termites, or white ants, sometimes mistaken for villages?

Because they are conically shaped, built of clay, generally with several points, arched internally, often ten or twelve feet high, and in great numbers. In time, these ant-hills become overgrown with grass, and so firm as to bear the weight of several men, although the walls are perforated by large wide passages, sometimes more than a foot in diameter. The cells of the king and queen, in each hill, are concealed in its remotest parts. Next to these are the habitations of the workers; then follow the egg-cells for the young brood, and close to them the magazine. The queen can lay 80,000 eggs within twenty-four hours.

Mr. Carpenter once turned the destroying powers of a termes to account in making some delicate dissections for the microscope. Having placed one in a pill-box with the heads of three dead flies, he found sometime after, that they had completely cleared the interior of some of the eyes from all the blood-vessels, leaving the lenses in the cornea most beautifully transparent.

Why are "monstrous ants in India, as large as foxes," described by old Greek writers?

Because the termites there rear such stupendous fabrics, as certainly might be supposed to be the work of a much larger animal than their real architect. Were our houses built according to the same proportions, they would be twelve or fifteen times higher than the London monument, and four or five times higher than the pyramids of Egypt, with corresponding dimensions in the basements of the edifices.

DIPTERA.

THE HOUSE-FLY.

Why are flies continually brushing themselves with their feet and legs?

Because by this means they rub off the dust, and clean their eyes, head, corslet, and wings,—and to enable them to do this, their foot closely resembles a currycomb. Thus, in the common blow-fly, there are two rounded combs, the inner surface of which is covered with down, to serve the double purpose of a fine brush, and to assist in forming a vacuum, when the creature walks on a glass, or on the ceiling of a room. In other flies, there are three such combs on each foot. The insects are pretty thickly covered with hair, and the serratures (or teeth) of the combs free them from entanglement and dust. Even the hairs on the legs themselves are similarly used; for, flies not only brush with the extremities of their feet, where the curious currycombs are situated, but use part of their legs in the same way, particularly for brushing one another.—*Mr. Rennie, in Journal of the Royal Institution.*

Why is the dogs'-bane so fatal to flies?

Because of the elasticity of the filaments of the plant, which close and catch the fly the instant the trunk is protruded to feed on the expanded blossom: the poor prisoner struggles till exhausted to death, the filaments then relax, and the body falls to the ground. The plant will at times be dusky from the number of imprisoned wretches.

APTERA.

THE FLEA.

Why has the flea been quoted as an instance of insects excelling in muscular power, in proportion to their diminutiveness?

Because it has been known to draw 70 or 80 times its own weight, resist the ordinary pressure of the fingers in our endeavours to crush it, and leap two hundred times its own length. Hence it is called by the Arabians, "the father of leapers." Supposing the same relative force to be infused into the body of a man six feet high, he would be enabled to leap three times the height of St. Paul's.

The feats of fleas drawing golden chains and coaches have been authenticated. Latreille tells us of a flea which dragged a silver cannon twenty-four times its own weight, mounted on wheels, and was not alarmed when this was charged with gunpowder, and fired off.

SPIDERS.

Why do some spiders rest in the centre of their webs?

Because the outstretched cordage may warn them of the temporary entanglement of their prey, on which they instantly rush, and devour, after the infliction of a mortal wound. Many lie in wait beneath leaves, and others spin comfortable tunnels, or watch-towers, as they may be called, in which they repose till the vibration of their nets below calls them into active service.

Why do other spiders spin no webs at all?

Because they trust to strength, activity, and cunning, for their daily, or, it may be, monthly fare; for spiders, though voracious in times of abundance, are capable of frequent and long-continued abstinence.

Vaillant had a spider that lived nearly a year without food, and was so far from being weakened by abstinence, that it immediately killed another large spider, equally vigorous, but not so hungry, that was put in along with it. Baker is known to have kept a beetle in a state of total abstinence for three years: it afterwards made its escape.

Several of this webless species leap, and others hunt down their insect food by speed of foot, and a few on the surface of water. A large species, common in Norfolk, constructs a raft of weeds, or floating island, on which it is wafted about, and from it seizes upon drowning insects.

Why is the bite of some spiders poisonous?

Because the claw of the mandible distils a deleterious liquid, analogous in its nature to that which exudes from the mouth of the scolopendra, and the tail or sting of the scorpion.

The bite of the *tarantula* spider, was said to produce symptoms equally severe with those of the most malignant fever, and of such a nature, as to be cured only by means of music. Some authors have even given a list of the most restorative tunes.

Why are some spiders called suckers?

Because, with their mandibles, resembling a pair of pincers, they compress the small animal on which they prey, and so force the alimentary juices to pass by degrees into the œsophagus. The body of their prey having undergone this operation, is then thrown aside.

A species in the West Indies kills humming-birds, and sucks their eggs. It is the size of a small child's fist; the soles of the feet glitter with gold, &c.

Some species of spider can reproduce lost or mutilated parts, like the crab and lobster. This fact was first observed in this country by Sir Joseph Banks, which gave rise to Dr. Wolcot's well-known satire.

Why do spiders spin threads in the air?

Because they may ascend and descend, cross from tree to tree, across streams, &c.; but whether this is accomplished by projectile force, by the electricity of the atmosphere, or by the mechanical action of the external currents of air, is still a subject of dispute. Messrs. Rennie, and Blackwall, maintain the necessity of a current of air as a moving force; Mr. Murray, Mr. Bowman, and others, maintain a contrary opinion; and Mr. Viray thinks it more probable, that spiders actually *fly*, by vibrating their feet through the air; he does not assert that they have wings.

Why do garden-spiders in part renew their nets in every twenty-four hours?

Because they catch their prey by the gummed threads of the web, which lose their viscid properties by the action of the air.*

Why ought not spiders'-webs to be destroyed in stables?

Because they benefit the horses: the more spiders'-webs, the fewer flies.

THE SCORPION.

Why does the scorpion carry its young on the back?

Because they are there protected and defended by the tail, at the extremity of which is the sting. Scorpions have frequent battles with ants, which may sometimes be seen dragging from the field one of their vanquished foes.—*Dr. Scot.*

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* Leuwenhoeck states, that the threads of the minutest spiders, some of which are not equal in bulk to a grain of sand, are so fine, that four millions of them would not exceed the thickness of a human hair. Each of the four spinners from which the web is spun, is pierced by about 1,000 holes, consequently, every compound or ordinary thread is composed of 40,000 still finer. Thus, a spider's thread, of the thickness of a human hair, may, in some instances, be composed of not fewer than 16,000 millions.

Why are scorpions killed by covering them with oil?
Because their respiration is thus prevented.

CRAB, LOBSTER, &C.

Why do not the crab and lobster appear "thin," when ill fed?

Because the stomach is formed on a bony apparatus, in short, a species of skeleton; and does not therefore collapse when empty. Hence the policy of choosing crabs and lobsters by their weight.

Why is the food of the crab and lobster sure to be perfectly masticated?

Because to certain parts of the bony structure of the stomach, round its aperture communicating with the small intestines, (or the pylorus) the teeth are affixed. They are extremely hard, and serrated, or jagged, and as they surround the tube near the pylorus, nothing can pass that has not been duly prepared. These bones and teeth (the latter three in number) are moved by peculiar muscles, and in the craw-fish are known to be annually reproduced.

Why do some crabs attach, by a glutinous matter, the leaves of sea-weeds to their body?

Because they may thus completely conceal their form, and secure themselves from the detection of their enemies.

Why are the two calcareous concretions (commonly called crabs' eyes), found in summer at both sides of the stomach of the craw-fish?

Because they furnish the principal materials from which the new shell is hardened. Some are naturally red, whilst others remain black, even when boiled; and some reach the age of twenty years.

END OF ZOOLOGY.